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REPORT

OF THE

GOVERNOR OF ARIZONA

TO THE

from

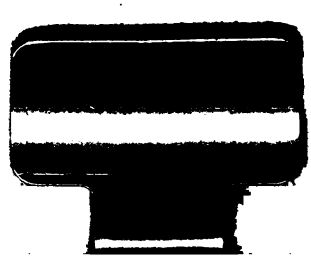
SECRETARY OF THE INTERIOR

Jan. 13, 03

FOR THE

YEAR ENDED JUNE 30, 1902.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1902.



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CONTENTS.

	Page.
General conditions	5
Population	6
Taxation and taxable property	10
Valuation of taxable property	11
Final valuations placed on railroad property	16
Total valuations by counties	16
Statement of the aggregate amount of each object of taxation	17
Average valuation	17
Tax levy for 1902	18
Financial condition	18
Territorial auditor	20
Condition of banks	20
Condition of building and loan associations	22
Attorney-general	22
Settlement of lands	23
Internal revenue	24
Customs	24
Irrigation and agriculture	24
The Hansborough-Newlands measure	25
Annual rainfall in Arizona	27
Water storage	27
Rainfall in Phœnix	29
Railways	30
Forest and lumber manufactures	35
Forest reserves	36
Mining	37
Territorial geologist	51
Live-stock industry	54
Wild animals of the Territory	56
Hunting and fishing	58
Natural scenery	58
Indians	59
Education	64
Summary of school statistics	65
University of Arizona	66
Tempe Normal School	71
Northern Arizona Normal School	74
Churches	77
Fraternal societies	81
Territorial prison	81
Reform school	84
National guard	86
Arizona rangers	88
Artesian water	88
Agriculture and horticulture	89
Public buildings	95
Labor supply	96
The press	97
Statehood	97
Recommendations	99

CONTENTS TO APPENDIX.

Apache County	100
Coconino County	102
Cochise County	103

	Page.
Gila County	104
Graham County	106
Mohave County	107
Maricopa County	108
Water supply for irrigation in the Salt River Valley	109
Navajo County	112
Pinal County	114
Pima County	116
Santa Cruz County	118
Yavapai County	119
Yuma County	123
Roster of Territorial officials	125

REPORT

OF THE

GOVERNOR OF ARIZONA.

EXECUTIVE DEPARTMENT, OFFICE OF THE GOVERNOR,
PHOENIX, ARIZ., *September 10, 1902.*

SIR: I have the honor to submit this, my report of the affairs, development, and resources of the Territory of Arizona, for the year ended June 30, 1902, in obedience to the instructions contained in your letter of July 5, 1902, received by me July 13, 1902, viz:

The GOVERNOR OF ARIZONA.

SIR: I have the honor to request that you will forward to this Department, as soon as possible, not later than the 15th of September next, a report of the affairs and of the progress and development of the Territory of Arizona, for the fiscal year ended June 30, 1902.

In order to secure uniformity in the subjects treated by the governors of the Territories in their annual reports, I have to request that you will present in your report, information upon the following topics, or so many of them as may be applicable to the Territory of Arizona:

Population; taxable property; settlement of lands; commerce and the progress of railroad enterprises; agricultural development; stock raising in all its branches; mining; forests and the production of lumber; education; labor supply; condition of the Indians in the Territory; public buildings; legislation; and undeveloped resources.

In treating of population comparative statements showing annual increase should be given, together with notes on the distribution, and, where practicable, on the character and nationality of immigration.

In treating of taxable property a succinct statement of the financial condition of the Territory should be given embodying liabilities and resources, bonded and floating debt of the Territory, as well as of the several counties composing the same.

The enumeration of the topics given above is not intended to exclude the presentation of other subjects which may commend themselves to you for embodiment in your annual report; on the contrary, the fullest information is desired upon all matters relating to the progress or affecting the welfare of the Territory.

In this connection it is proper to add that heretofore many of the reports of the governors of the Territories have been very voluminous, owing to the inclusion therein of photographs and exhibits, doubtless of local importance but of little interest to the general public whom the report is destined to reach. In the interest, therefore, of economy, it is desirable that the reports be as brief as circumstances will permit, that all unimportant exhibits be omitted, as well as photographs, not intended to show the condition and industrial progress of the Territory.

It is necessary that your report be submitted within the time above specified, in order that proper consideration may be given to the various and important subjects requiring attention in the preparation of the Annual Report of the Secretary of the Interior.

A compliance with this request at an early date is important.

Very respectfully,

E. A. HITCHCOCK, *Secretary.*

GENERAL CONDITIONS.

Arizona, the sixth largest political division of the United States, contains within its boundaries 113,000 square miles of area, or 72,320,000 acres, and from the variety of its resources, the beauty of its climate,

and the grandeur of its scenery is one of the most interesting and attractive of all the great subdivisions of our common country. The infinite beauty of the mountains; the sublimity of the Grand Canyon of the Colorado in Arizona, the beauty and extent of the forest area are all attractive to the tourist who visits this favored section, while the richness of the mines found in every section of the Territory, the value and possibilities of the farming lands under irrigation, and the great strides that have been made in the cattle industry, aided by that kindly provision of nature which prevents the necessity of feeding cattle further than to fatten them for market, brings to this Territory that stable and worthy population, the backbone of every country—producers of wealth—the farmer, the miner, the cattleman.

During the past year the condition of the Territory has been one of more than average prosperity, with the exception that the excessive drought has had a depressing effect upon the cattle and agricultural industries, and lessened to some extent the output in both, while the mining industry has made during the year most unprecedented strides, the increased production of the precious metals offsetting many-fold the depression in the other industries of the Territory.

POPULATION.

The increase in permanent population has been gradual throughout the year, while, owing to the health-giving climate, this Territory is the Mecca for many invalids, to whom a temporary sojourn is beneficial.

By the census of 1900 the total white population of Arizona was given as 92,903, of which 55,230 were males and 37,673 females; the number of Indians was given as 26,480; negroes, 1,848, of which 1,387 were males and 32 females; Japanese numbered 247, of which 17 were females.

Of the white population, as given in the census of 1900, 70,508 are native born, while 22,395 are of foreign birth; and in all probability of the foreign born 50 per cent are Mexicans, the other being divided among the nationalities—Swedish, Irish, German, etc.

The inhabitants of Arizona are a law-abiding, energetic, and progressive class, and, allowing for natural increase, the population of the Territory should be estimated at about 140,000 for June 30, 1902.

Below will be found a tabulated statement of the result of the various censuses taken in the Territory, with such other information as can be given under that head:

Arizona was organized as a Territory February 24, 1863. In 1860 Arizona constituted the county of Arizona, in the Territory of New Mexico, and had a population of 6,482. Table 1 shows the population of Arizona at each census from 1870 to 1900, inclusive, together with the increase by number and per cent during each decade.

TABLE 1.—*Population of Arizona, 1870 to 1900.*

Census years.	Population.	Increase.	
		Number.	Per cent.
1900	122,212	62,592	104.9
1890	59,620	19,180	47.4
1880	40,440	30,782	318.7
1870	9,658	.....	.....

The population of the Territory in 1900 is 122,212 as compared with a population in 1890 of 59,620. This shows an increase during the decade of 62,592, or 104.9 per cent. This large increase is due in part to the fact that there were 28,469 Indians and 154 other persons, or a total of 28,623 persons, on Indian reservations, etc., in Arizona who were specially enumerated in 1890 under the provisions of the census act, but were not included in the general population of the Territory at that census. The population of the Territory in 1870 was 9,658, and during the ten years from 1870 to 1880 it increased 30,782, or 318.7 per cent, giving a population in 1880 of 40,440. The population in 1890, as stated in the report for that census, was 59,620, representing an increase during the decade of 19,180, or 47.4 per cent.

The population of Arizona in 1900 is more than twelve times as large as the population given for 1870, the first census taken after its organization as a Territory in 1863.

TABLE 2.—*Population of Arizona, by counties, 1860 to 1900.*

Counties.	1900.	1890.	1880.	1870.	1860.
The Territory	122,212	59,620	40,440	9,658	[a] 6,682
Apache [b]	8,452	4,281	5,283	.....	.....
Cochise [c]	9,251	6,938	.....	.....	.....
Coconino [d]	5,344	.....	.....	.....	.....
Gila [e]	[f] 4,264	2,021	.....	.....	.....
Graham [g]	[f] 14,162	5,670	.....	.....	.....
Maricopa [e]	21,352	10,986	5,689	.....	.....
Mohave	3,443	1,444	1,190	179	.....
Navajo [h]	[f] 8,817	.....	.....	.....	.....
Pima [i]	14,689	12,673	17,006	5,716	.....
Pinal [e]	6,884	4,251	3,044	.....	.....
Santa Cruz [j]	4,545	.....	.....	.....	.....
Yavapai [d]	13,799	8,685	5,013	2,142	.....
Yuma	4,145	2,671	3,215	1,621	.....
San Carlos Indian Reservation [k]	3,065	.....	.....	.....	.....

[a] Then the county of Arizona, in the Territory of New Mexico.
[b] Parts taken to form Graham in 1881 and Navajo in 1895.
[c] Organized from part of Pima in 1881.
[d] Coconino organized from part of Yavapai in 1891.
[e] Gila organized from parts of Maricopa and Pinal in 1881.
[f] Exclusive of population of San Carlos Indian Reservation.
[g] Organized from parts of Apache and Pima in 1881.
[h] Organized from part of Apache in 1895.
[i] Parts taken to form Cochise and Graham in 1881 and Santa Cruz in 1899.
[j] Organized from part of Pima in 1899.
[k] In Gila, Graham, and Navajo counties, but the population in each county was not separately returned.

TABLE 3.—*Increase in population of Arizona, by counties, 1890 to 1900.*

Counties.	Increase.		Counties.	Increase.	
	Number.	Per cent.		Number.	Per cent.
The Territory	62,592	104.9	Navajo	8,717	.....
Apache	4,171	97.4	Pima	2,016	15.9
Cochise	2,313	33.3	Pinal	2,633	61.9
Coconino	5,344	.....	Santa Cruz	4,545	.....
Gila	2,243	110.9	Yavapai	5,114	58.8
Graham	8,492	149.7	Yuma	1,474	55.1
Maricopa	10,366	94.3	San Carlos Indian Reservation	3,065	.....
Mohave	1,999	138.4			

The following territorial changes in the counties of Arizona have been made since 1890: Part of Yavapai taken to form Coconino in 1891; part of Apache taken to form Navajo in 1895, and part of Pima taken to form Santa Cruz in 1899.

As above stated, three counties—namely, Coconino, Navajo, and Santa Cruz—have been formed since 1890. The remaining ten counties all show increases in population since 1890, and some of them very large increases. These large increases are due in certain cases, however, to the exclusion from the general population of the Territory in 1890 of Indians and other persons on Indian reservations, etc.

The population of Arizona can not be given by precincts for the different counties in 1900, as it is not separately returned. Table 4 shows the population of Arizona by cities, towns, and Indian reservations, so far as it was separately returned at the censuses of 1890 and 1900.

TABLE 4.—*Population of Arizona, by minor civil divisions, 1890 and 1900.*

Minor civil divisions.	1900.	1890.
Apache County[a]	8,452	4,281
Fort Apache Indian Reservation (part of)	360	.....
Total for Fort Apache Indian Reservation in Apache, Gila, and Navajo counties	1,786	.....
Navajo Indian Reservation (part of)	5,136	.....
Total for that part of Navajo Indian Reservation in Apache, Coconino, and Navajo counties, Ariz.	6,257	.....
Cochise County	9,251	6,938
Tombstone, city	646	1,875
Coconino County[b]	5,344	.....
Flagstaff, town	1,271	963
Hualapai Indian Reservation (part of)	14	.....
Total for Hualapai Indian Reservation, in Coconino and Mohave counties	635	.....
Navajo Indian Reservation (part of)	709	.....
[For total of that part of Navajo Indian Reservation in Arizona see Apache County.]		
Supai Indian Reservation (part of)	220	.....
Total for Supai Indian Reservation, in Coconino and Mohave counties	236	.....
Gila County[c]	4,264	2,021
Globe, town	1,495	808
Fort Apache Indian Reservation (part of)	720	.....
[For total see Apache County.]		
Graham County[c]	14,162	5,670
Pima, town	521	750
Solomonville, city	629	287
Thatcher, town	644	320
Maricopa County	21,352	10,986
Mesa, town	722	.....
Phoenix, city	5,544	3,152
Ward 1	1,588	
Ward 2	1,748	
Ward 3	1,347	
Ward 4	861	
Tempe, town	892	.....
Gila Bend Indian Reservation	227	.....
Gila River Indian Reservation (part of)	1,454	.....
Total for Gila River Indian Reservation in Maricopa and Pinal counties	2,954	.....
Salt River Indian Reservation	1,665	.....
Mohave County	3,443	1,444
Chloride, town	466	.....
Hualapai Indian Reservation (part of)	621	.....
[For total see Coconino County.]		
Supai Indian Reservation (part of)	16	.....
[For total see Coconino County.]		

[a] Part taken to form Navajo County in 1895.
[b] Organized from part of Yavapai County in 1891.
[c] Exclusive of part of San Carlos Indian Reservation.

TABLE 4.—*Population of Arizona, by minor civil divisions, 1890 and 1900*—Continued.

Minor civil divisions.	1900.	1890.
Navajo County[a]	8,817	.....
Winslow, town	1,305	363
Fort Apache Indian Reservation (part of)	796	.....
[For total see Apache County.]		
Moqui Indian Reservation	3,807	.....
Navajo Indian Reservation (part of)	412	.....
[For total of that part of Navajo Indian Reservation in Arizona see Apache County.]		
Pima County[b]	14,689	12,673
Tucson, city	7,531	5,150
Nomadic Indians	565	.....
San Xavier Indian Reservation	978	.....
Pinal County	6,884	4,251
Gila River Indian Reservation (part of)	1,500	.....
[For total see Maricopa County.]		
Nomadic Indians	559	.....
Santa Cruz County[c]	4,545	.....
Nogales, town	1,761	1,194
Yavapai County[d]	13,799	8,685
Jerome, town	2,861	250
Prescott, city	3,559	1,759
Yuma County	4,145	2,671
Yuma, city	1,402	1,773
Colorado River Indian Reservation	558	.....
San Carlos Indian Reservation[e]	3,065	.....

[a] Organized from part of Apache County in 1895; exclusive of part of San Carlos Indian Reservation.
[b] Part of Pima County taken to form Santa Cruz County in 1899.
[c] Part of Pima County taken to form Santa Cruz County in 1899.
[d] Part taken to form Coconino County in 1891.
[e] Located in Gila, Graham, and Navajo counties.

There are 16 incorporated cities and towns in Arizona, for which the population in 1900 is separately returned, and these incorporated places are presented in Table 5 in alphabetical order, being abstracted from Table 4, in which they are presented in detail under the counties in which they are severally situated.

TABLE 5.—*Population of the incorporated cities and towns of Arizona, 1890 and 1900.*

Cities and towns.	Population.		Cities and towns.	Population.	
	1900.	1890.		1900.	1890.
Chloride, town	466	.....	Prescott, city	3,559	1,759
Flagstaff, town	1,271	963	Solomonville, city	629	287
Globe, town	1,495	803	Tempe, town	892	.....
Jerome, town	2,861	250	Thatcher, town	644	320
Mesa, town	722	.....	Tombstone, city	646	1,875
Nogales, town	1,761	1,194	Tucson, city	7,531	5,150
Phoenix, city	5,544	3,152	Winslow, town	1,305	363
Pima, town	521	750	Yuma, city	1,402	1,773

Of the above-named 16 incorporated places there are only 4 that have a population in 1900 of more than 2,000, namely: Tucson, city, with 7,531; Phoenix, city, with 5,544; Prescott, city, with 3,559, and Jerome, town, with 2,861 inhabitants.

TABLE 6.—*Native and foreign born and white and colored population, classified by sex, by counties, 1900.*

Counties.	Native born.		Foreign born.		Native white—native parents.		Native white—foreign parents.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Arizona	55,893	42,805	15,902	8,331	26,631	18,199	14,410	11,268
Apache	4,241	3,896	103	57	1,183	987	228	198
Cochise	4,073	2,440	1,838	900	2,409	1,323	1,410	1,080
Coconino	2,931	1 768	651	164	1,684	882	565	303
Gila	2,419	1,693	622	239	1,546	940	518	329
Graham	5,698	4,482	2,612	1,370	3,716	2,905	1,907	1,545
Maricopa	9,397	8,228	1,770	1,062	5,478	4,704	2,193	1,968
Mohave	1,806	1,225	328	67	740	392	335	175
Navajo	4,631	3,806	210	92	1,318	1,019	400	366
Pima	5,470	4,801	2,411	2,007	1,782	1,226	2,388	2,290
Pinal	3,592	2,735	941	511	822	501	882	733
Santa Cruz	1,290	1,097	1,164	994	506	369	768	726
Yavapai	6,921	3,685	2,583	610	4,528	2,422	2,158	1,078
Yuma	1,932	1,291	664	258	903	518	655	471
San Carlos Indian Reservation	1,492	1,568	5	.....	16	11	3	6

Counties.	Foreign white.		Total colored.[a]		Negro.[b]	
	Males.	Females.	Males.	Females.	Males.	Females.
Arizona	14,189	8,206	16,565	13,463	1,363	485
Apache	102	57	2,831	2,711	1	1
Cochise	1,733	898	359	39	238	37
Coconino	472	163	861	584	32	21
Gila	575	234	402	429	28	20
Graham	2,476	1,368	211	34	38	30
Maricopa	1,622	1,050	1,874	1,568	116	94
Mojave	196	57	863	668	101	76
Navajo	154	90	2,969	2,513	270	56
Pima	2,115	1,945	1,596	1,347	77	41
Pinal	869	500	1,960	1,512	362	55
Santa Cruz	1,124	994	56	2	9	1
Yavapai	2,165	598	653	197	72	51
Yuma	583	252	455	308	19	2
San Carlos Indian Reservation	3	.....	1,475	1,551	.....	.....

[a] Persons of negro descent, Chinese, Japanese, and Indians.
[b] Includes all persons of negro descent.

TAXATION AND TAXABLE PROPERTY.

The average rate of taxation in the several counties in Arizona is excessively high as compared with older and wealthier Commonwealths. This results from various causes; first, being the added expenses and responsibility in all new communities to secure the construction and maintenance of Territorial institutions, such as the Territorial capitol, insane asylum, Territorial prison, reform school for juvenile offenders, University of Arizona, normal schools, the various buildings at the several county seats, and the separate and extensive school buildings of the common school system throughout the several counties; second, from the inadequate methods of listing and assessment of property, which throws the greater proportion of the burden upon the small holder and does not secure proportionate returns from the larger and more extensive holder; third, the injustice of allowing that great wealth-producing industry, mining, to escape on a comparatively small percentage of valuation; and fourth, the impossibility of making accurate lists of range cattle and horses for assessment.

A proper and just listing and valuation of all property in the Territory of Arizona would result in lowering the tax rate, the securing of

necessary funds for the proper maintenance of the Territorial government without unjust burdens upon any, and give added encouragement to the investment of capital within the Territorial boundaries.

A just and equitable listing and taxation of all large producing and valuable mines would work no hardship, as all then would bear their share in securing revenue to the Territory in which their work progresses and from which they gain their large returns in cash income.

The total taxable property of the Territory, as given by the assessment lists of this year, amounts to $39,083,177.57.

The report of the final valuations of property in the different counties shows material gains over the preceding year's valuations in seven counties, six showing losses. The following counties are those which have gained in taxable property, according to the final valuation placed upon it by the board of equalization at the meeting held August 11, 1902, the amount gained following the name of county: Coconino, $2,393,465.76; Gila, $259,078.48; Graham, $442,039.30; Maricopa, $58,367; Pima, $148,658.13; Yavapai, $872,587.57; Yuma, $31,727.37.

Those counties showing losses are Apache, $68,620.66; Cochise, $3,447,922.66; Mohave, $23,541.17; Navajo, $224,281.04; Santa Cruz, $110,855.16; Pinal, $101,356.72.

VALUATION OF TAXABLE PROPERTY.

At the August meeting of the board of equalization the following final valuations were placed upon the taxable property of the different counties of Arizona:

Final valuations of property in each county in Arizona for 1902.

APACHE COUNTY.

Property.	Number.	Valuation.	Per cent increased.
Cultivated land.....acres..	4,288	$39,143.10	.....
Improvements	.....	11,259.50	.....
Uncultivated land.....acres..	20,933	29,266.35	.....
Improvements	.....	10,758.00	.....
Railroad land.....acres..	856,335.61	171,267.12	.....
Town and city lots	448	17,437.00	.....
Improvements	.....	43,899.50	.....
Horses:			
Range	1,423	14,597.00	.....
Work	614	17,160.00	.....
Saddle	459	8,608.00	.....
Stallions	11	520.00	.....
Mules	48	1,522.00	.....
Asses	148	1,472.00	.....
Cattle:			
Range and stock	3,776	52,864.00	.....
Milch cows	367	7,340.00	.....
Sheep	91,787	183,574.00	.....
Goats	620	1,240.00	.....
Swine	67	201.00	3.4
Railroad, standard gauge.....miles..	54.48	136,200.00	.....
All other property	.....	122,419.00	.....
Total	.....	870,747.57	.....

COCHISE COUNTY.

Land.....acres..	44,616	$89,121.50	.....
Improvements	.....	57,543.00	.....
Land grants.....acres..	47,000	85,000.00	.....
Patented mines	297	169,957.65	.....
Improvements	.....	144,501.76	.....
Town and city lots	2,531	47,405.00	.....
Improvements	.....	644,820.00	.....

Final valuations of property in each county in Arizona for 1902—Continued.

COCHISE COUNTY—Continued.

Property.	Number.	Valuation.	Per cent increased.
Horses:			
Range	1,481	$14,750.00	
Work	1,043	31,689.00	
Saddle	1,256	25,420.00	
Stallions	12	645.00	
Mules	133	3,535.00	
Asses	69	328.00	
Cattle:			
Range and stock	47,554	475,540.00	2
Milch cows	226	4,637.00	
Bulls	427	10,250.00	
Sheep	4,040	8,080.00	10
Goats	1,137	2,274.00	4.7
Swine	118	354.00	9
Railroad, standard gauge.....miles..	200.35	1,239,405.90	
All other property		995,227.96	
Total		4,050,484.77	

COCONINO COUNTY.

Land.....acres..	29,886.24	$87,748.07	
Improvements		31,030.00	
Railroad land.....acres..	969,173.06	2,423,132.60	
Land grants.....do....	146,021.53	38,550.34	
Patented mines	2	2,000.00	
Town and city lots	4,608	163,158.00	
Improvements		319,966.00	
Horses:			
Range	2,406	24,060.00	
Work	677	27,080.00	
Saddle	672	16,800.00	
Stallions	6	950.00	
Mules	61	2,440.00	
Asses	190	1,020.00	
Cattle:			
Range and stock	13,126	135,854.10	
Beef	24	480.00	
Milch cows	211	5,802.00	
Bulls	45	710.00	
Sheep	140,380	280,760.00	
Goats	700	1,400.00	
Swine	187	1,108.00	
Railroad, standard gauge.....miles..	135.66	296,650.00	
All other property		595,776.75	
Total		4,456,475.86	

GILA COUNTY.

Cultivated land.....acres..	2,973	$16,880.00	
Improvements		6,145.00	
Uncultivated land, improvements		177,407.00	
Patented mines	62	143,150.00	
Improvements		241,380.00	
Improvements on unpatented mines		94,390.00	
Town and city lots		339,524.00	
Horses:			
Range	1,246	12,460.00	
Work	483	12,075.00	
Saddle	1,050	21,000.00	
Stallions	11	470.00	
Mules	73	1,825.00	10.6
Asses	202	1,010.00	
Cattle:			
Range and stock	30,662	306,620.00	
Milch cows	94	1,880.00	6.8
Bulls	6	155.00	
Sheep	155	310.00	
Goats	9,575	19,150.00	
Swine	353	1,059.00	
All other property		201,200.00	
Total		1,598,090.00	

Final valuations of property in each county in Arizona for 1902—Continued.

GRAHAM COUNTY.

Property.	Number.	Valuation.	Per cent increased.
Uncultivated land ..... acres..	31,030	$167,495.75	.....
Improvements	.....	568,309.50	.....
Cultivated land ..... acres..	16,486	300,151.53	.....
Improvements	.....	91,083.70	.....
Patented mines	137	277,658.42	.....
Improvements	.....	125,811.00	.....
Town and city lots	1,803	102,451.00	.....
Improvements	.....	203,437.50	.....
Horses:			
Range	1,117	12,681.00	.....
Work	1,310	52,216.00	.....
Saddle	1,809	45,020.00	.....
Stallions	9	830.00	.....
Mules	88	3,155.00	.....
Asses	233	2,135.00	.....
Cattle:			
Range and stock	44,571	446,125.00	.....
Milch cows	1,012	20,645.00	.....
Bulls	38	1,115.00	.....
Sheep	4,012	8,024.00	.....
Goats	7,977	15,954.00	2
Swine	370	1,110.00	30.4
Railroad:			
Standard gauge ..... miles..	41	210,779.00	.....
Narrow gauge ..... do....	18	64,500.00	.....
All other property	.....	668,088.42	.....
Total	.....	3,388,775.82	.....

MARICOPA COUNTY.

Land ..... acres..	282,323	$3,356,448.00	.....
Improvements	.....	453,182.45	.....
Patented mines	12	3,000.00	.....
Town and city lots	14,897	2,472,272.00	.....
Improvements	.....	1,525,410.00	.....
Horses:			
Stock	1,802	18,200.00	.....
Work	2,807	70,175.00	.....
Stallions	24	2,120.00	.....
Mules	234	6,850.00	.....
Asses	10	855.00	.....
Cattle:			
Range and stock	16,121	161,210.00	.....
Beef	468	7,435.00	.....
Milch cows	4,104	102,600.00	.....
Bulls	240	6,000.00	.....
Sheep	11,770	23,540.00	.....
Goats	1,245	2,490.00	37
Swine	2,026	6,065.00	.....
Railroad, standard gauge ..... miles..	97.09	633,827.55	.....
All other property	.....	784,770.00	.....
Total	.....	9,636,450.00	.....

MOHAVE COUNTY.

Land ..... acres..	1,076	$1,780.00	.....
Improvements	.....	2,925.00	.....
Railroad land ..... acres..	42,445	8,489.00	.....
Patented mines	123	105,506.60	.....
Improvements	.....	71,340.00	.....
Improvements on unpatented mines	.....	53,000.00	.....
Town and city lots	765	40,877.70	.....
Improvements	.....	85,280.00	.....
Horses:			
Range	573	11,460.00	.....
Work	242	12,100.00	.....
Saddle	614	21,490.00	.....
Stallions	2	100.00	.....
Mules	9	315.00	.....
Asses	34	170.00	.....
Cattle:			
Range and stock	10,891	108,910.00	.....
Milch cows	108	2,160.00	.....
Bulls	6	150.00	.....

Final valuations of property in each county in Arizona for 1902—Continued.

MOHAVE COUNTY—Continued.

Property.	Number.	Valuation.	Per cent increased.
Sheep	215	$430.00	
Goats	2,500	5,000.00	
Swine	54	162.00	
Railroad, standard gauge.....miles..	107,881	269,702.50	
All other property		206,448.43	
		1,007,796.23	
Less widows' exemptions		8,645.00	
Total		999,151.23	

NAVAJO COUNTY.

Cultivated land.....acres..	1,673.5	$33,145.00	
Uncultivated land.....do....	11,884.75	22,168.85	
Improvements on cultivated and on uncultivated land		18,707.00	
Railroad land.....acres..	721,108.57	204,680.53	
Land grants.....do....	302,294.09		
Town and city lots		93,918.57	
Improvements		180,512.00	
Horses:			
Range	1,282	12,820.00	
Work	440	17,600.00	
Saddle	278	5,560.00	
Stallions	7	350.00	
Mules	21	630.00	
Asses	76	380.00	
Cattle:			
Range and stock	2,228	26,736.00	
Milch cows	385	7,700.00	
Bulls	20	300.00	
Sheep	70,455	140,910.00	
Goats	175	375.00	
Swine	92	460.00	
Railroad, standard gauge.....miles..	57,155	142,887.50	
All other property		183,064.69	
Total		1,092,905.14	

PIMA COUNTY.

Land.....acres..	60,380.5	$174,110.00	
Improvements		91,649.00	
Land grants.....acres..	17,208.3	12,906.22	50
Improvements		2,000.00	
Patented mines	202	63,160.00	
Improvements		3,900.00	
Improvements on unpatented mines		8,500.00	
Town and city lots		797,665.00	
Improvements		1,178,530.00	
Horses:			
Range	1,537	15,370.00	
Work	684	17,795.00	
Saddle	713	14,305.00	
Stallions	25	800.00	
Mules	93	2,320.00	
Asses	15	75.00	
Cattle:			
Range and stock	21,660	216,600.00	
Milch cows	381	7,620.00	14
Bulls	218	4,310.00	
Sheep	5,140	10,280.00	
Goats	10	20.00	
Swine	19	57.00	
Railroad, standard gauge.....miles..	64.75	454,674.50	
All other property		648,904.87	
Total		3,725,551.59	

Final valuations of property in each county in Arizona for 1902—Continued.

PINAL COUNTY.

Property.	Number.	Valuation.	Per cent increased.
Land.....acres..	60,929	$402,975.00	.....
Improvements	.....	47,466.00	.....
Patented mines	51	42,650.00	
Improvements	.....	6,675.00	.....
Town and city lots	868	37,096.00	.....
Improvements	.....	61,469.00	.....
Horses, all kinds	2,220	27,480.00	.....
Mules	78	1,950.00	6.5
Asses	89	445.00	.....
Cattle, all kinds	15,984	181,020.00	.....
Sheep	3,500	7,000.00	.....
Goats	1,000	2,000.00	.....
Swine	218	654.00	5.6
Railroad, standard gauge.....miles..	80.29	541,869.45	.....
All other property	.....	320,206.72	.....
Total	.....	1,680,956.17	.....

SANTA CRUZ COUNTY.

Land.....acres..	12,793.91	$29,157.50	.....
Improvements	.....	53,756.00	.....
Land grants.....acres..	34,722	34,326.00	.....
Patented mines	60	54,850.00	.....
Improvements	.....	6,750.00	.....
Town and city lots	.....	160,798.00	.....
Improvements	.....	218,761.00	.....
Horses:			
Range	1,312	13,120.00	36.4
Work	426	10,650.00	6.4
Saddle	187	3,740.00	8.1
Stallions	11	530.00	.....
Mules	76	1,900.00	.6
Asses	37	240.00	.....
Cattle:			
Range and stock	15,014	150,140.00	4
Milch cows	129	2,580.00	1.1
Bulls	249	4,325.00	.....
Swine	26	78.00	9
Railroad, standard gauge.....miles..	52.4	222,179.60	.....
All other property	.....	335,631.29	.....
Total	.....	1,303,511.39	.....

YAVAPAI COUNTY.

Land.....acres..	78,839.25	$181,414.10	.....
Improvements	.....	98,777.00	.....
Railroad land.....acres..	216,800.61	43,360.12	.....
Land grants.....do....	99,445.02	74,584.00	.....
Improvements	.....	5,600.00	.....
Patented mines	674	1,000,864.41	.....
Improvements	.....	809,205.00	.....
Improvements on unpatented mines	.....	177,035.00	.....
Town and city lots	.....	481,766.00	.....
Improvements	.....	809,227.00	.....
Horses:			
Range	1,878	18,780.00	.....
Work	1,426	39,090.00	.....
Saddle	1,009	21,860.00	.....
Stallions	12	495.00	.....
Mules	129	3,775.00	.....
Asses	175	1,074.00	.....
Cattle:			
Range and stock	23,865	238,650.00	.....
Milch cows	560	11,365.00	.....
Bulls	11	239.00	.....
Sheep	36,070	72,140.00	.....
Goats	10,728	21,456.00	.....
Swine	203	735.00	.....
Railroad, standard gauge.....miles..	60.558	151,395.00	.....
All other property	.....	957,849.26	.....
Total	.....	5,220,735.91	.....

Final valuations of property in each county in Arizona for 1902—Continued.

YUMA COUNTY.

Property.	Number.	Valuation.	Per cent increased.
Land.....acres..	32,165	$56,459.02	
Improvements		5,115.00	
Patented mines	21	5,028.00	
Improvements		24,500.00	
Improvements on unpatented mines	12	22,250.00	
Town and city lots	860	97,616.00	
Improvements		94,855.00	
Horses:			
Range	282	3.416.80	
Work	858	21,450.00	
Saddle	141	2,870.00	
Stallions	5	215.00	
Mules	25	625.00	0.8
Asses	6	70.00	
Cattle:			
Range and stock	1,090	12,001.00	
Beef	12	195.00	
Milch cows	216	4,316.00	
Bulls	23	390.00	
Swine	1,908	5,724.00	
Railroad, standard gauge.....miles..	82.5	579,315.00	
All other property		122,931.30	
Total		1,059,342.12	

SCHEDULE B.—*Final valuations placed on railroad property for the year 1902.*

Name of railroad.	Number of miles.	Rate per mile.	Total valuation.
Southern Pacific	392.5	$7,022.00	$2,756,135.00
Arizona and Southeastern	40.2	6,078.55	244,358.00
Maricopa and Phoenix and Salt River Valley	34.38	4,989.85	171,551.00
New Mexico and Arizona	87.8	4,240.07	372,278.00
Arizona and New Mexico	41	5,140.95	210,779.00
El Paso and Southwestern	22.5	5,642.22	126,950.00
Morenci Southern	18	3,583.33	64,500.00
Central Arizona	11	1,363.64	15,000.00
Saginaw Southern	18	833.33	15,000.00
Sante Fe Pacific	386.734	2,500.00	966,835.00
	1,052.114		4,943,386.00
Property of the Pullman Company			55,048.32
Total			4,998,434.32

There are 462 miles of railways within the Territory exempt from taxation for a number of years by legislative enactment.

SCHEDULE C.—*Total valuations, by counties, for the year 1902.*

County.	Amount.
Apache	$870,747.57
Cochise	4,050,484.77
Coconino	4,456,475.86
Gila	1,598,090.00
Graham	3,388,775.82
Maricopa	9,636,450.00
Mohave	999,151.23
Navajo	1,092,905.14
Pima	3,725,551.59
Pinal	1,680,956.17
Santa Cruz	1,303,511.39
Yavapai	5,220,735.91
Yuma	1,059,342.12
Total valuation for 1902	39,083,177.57
Total valuation for 1901	38,853,831.37
Net gain over 1901	229,346.20

SCHEDULE D.—*Statement of the aggregate amount of each object of taxation in the Territory for the year 1902.*

692,277.15 acres cultivated and uncultivated land	$4,987,463.89
Improvements	1,725,112.15
3,452,553.79 acres land grants and railroad lands	3,096,295.93
Improvements	7,600.00
1,641 patented mines	1,867,825.08
Improvements on patented and unpatented mines	1,789,237.76
Town and city lots	4,672,460.27
Improvements	5,545,691.00
37,892 horses	722,972.80
1,068 mules	30,842.00
1,284 asses	9,274.00
256,122 cattle	2,726,969.00
367,524 sheep	735,048.00
35,667 goats	71,359.00
5,641 swine	17,767.00
1,052,~~114~~ miles railroad	4,943,386.00
All other property	6,133,873.69
Total	39,083,177.57

Average valuations.

Land, cultivated and uncultivated	per acre	$7.20
Lands, grants and railroad land	do	.90
Horses	per head	19.08
Mules	do	28.87
Asses	do	7.22
Cattle	do	10.64
Sheep	do	2.00
Goats	do	2.00
Swine	do	3.14
Railroads:		
Standard gauge	per mile	4,824.21
Narrow gauge	do	3,583.33
Logging roads	do	1,034.48
If the Santa Fe Pacific is excluded from the above figures the average valuation of standard-gauge railroads per mile would be		6,277.77

INCREASES.

Improvement on land	$447,836.09	
Land grants and railroad land	2,283,247.62	
Improvements on patented and unpatented mines	269,316.76	
Town and city lots	84,493.70	
Improvements	274,132.45	
Goats	17,869.00	
Swine	4,575.75	
Railroads	171,786.55	
All other property	75,862.60	
		$3,629,120.52

DECREASES.

Land, cultivated and uncultivated	$17,211.62	
Patented mines	2,915,648.23	
Horses	145,707.22	
Mules	4,390.00	
Asses	545.00	
Cattle	295,383.25	
Sheep	20,889.00	
		3,399,774.32
Net increase over 1901		229,346.20

TAX LEVY FOR 1902.

The following is the tax levy per $100 of valuation for the year 1902 for Territorial purposes:

1.	Territorial general fund (par. 3831, R. S., 1901)	$0.35
2.	Territorial insane asylum interest fund (par. 3615, R. S., 1901)	.10
3.	Territorial normal school fund (par. 3702, R. S., 1901)	.05
4.	Territorial school fund (par. 2246, R. S., 1901)	.03
5.	Territorial reform school fund (par. 3762, R. S., 1901)	.05
6.	University fund (par. 3652, R. S., 1901)	.06
7.	Northern Arizona normal school fund (par. 3718, R. S., 1901)	.025
8.	Prison fund (par. 3601, R. S., 1901)	.12
9.	Ranger fund (par. 3229, R. S., 1901)	.05
10.	Redemption fund (par. 3615, R. S., 1901)	.02
11.	Capitol building fund (act No. 35, Laws 1901)	.035
12.	Interest World's Fair bonds (act 103, Laws 1891)	.002
13.	Territorial interest fund (R. S., 2047, and act of Congress 1890)	.14
14.	Territorial prison improvement fund (act 14, Laws 1901)	.035
15.	Normal school of Arizona dormitory fund (par. 3699, R. S., 1901)	.02
16.	Northern Arizona normal school fund (par. 3719, R. S., 1901)	.01
17.	Insane asylum improvement fund (act 62, Laws 1901)	.03
18.	University interest fund (par. 3663, R. S., 1901)	.005
19.	Interest on St. Louis International Exposition bonds (act No. 86, sec. 10, Laws 1901)	.005
	Total	1.137

FINANCIAL CONDITION.

The financial condition of the Territory is most flattering, evidence of this being obvious in the sale of the World's Fair bonds for the St. Louis Exposition at a premium of 7 per cent. This creditable showing is no doubt due to the prompt payment of interest on outstanding indebtedness of the Territory and retrenchment in the public service.

The bonded and floating indebtedness of Arizona, June 30, 1902, as shown by the statement of the Territorial treasurer is as follows:

Statement of the bonded and floating indebtedness of the Territory June 30, 1902.

Date.	Title.	Time.	Rate.	Amount.
		Years.	*Per cent.*	
July 1, 1885	Insane asylum bonds	20	7	$40,000.00
Jan. 15, 1888	Territorial funding bonds	25	6	140,000.00
July 15, 1892	.....do	50	5	2,000,000.00
Jan. 15, 1896	.....do	50	5	300,000.00
July 1, 1892	World's Fair bonds	20	5	30,000.00
June 1, 1898	Capitol building bonds	50	5	100,000.00
	Total			2,610,000.00
	Deduct county and city indebtedness			1,634,027.57
	Bonded debt account of Territory			975,972.43
	Floating debt (general fund warrants)			119,839.02
	Total			1,095,811.45
	Cash in hands of treasurer available for the redemption of the above Territorial indebtedness			30,349.55
	Net indebtedness account of Territory			1,065,461.90

Statement of balances in the various funds in the Territorial treasury on June 30, 1902.

General fund	$17,863.75
Insane asylum	10,422.46
University interest	1,612.69
Normal school	3,728.70
Territorial school	1,489.75
Interest	43,536.26
Northern Arizona Normal School	3,807.01
Redemption	3,485.80
University	4,742.61
Interest World's Fair bonds	1,615.19
Prison	14,409.71
Capitol building	4,127.76
Capitol interest	5,342.10
Insane asylum improvement	12,091.73
Funding	5.89
License and inspection	4,256.63
Reform school	98.29
Ranger	4,538.29
Prison improvement	627.79
Dormitory	6,151.21
	143,953.62

Statement of balances in the various funds in the Territorial treasury at close of business August 7, 1902.

General fund	$913.35
Insane asylum fund	7,481.86
University interest fund	1,716.35
Normal school fund	4,291.05
Territorial school fund	1,473.98
Interest fund	16,512.07
Northern Arizona Normal School fund	4,312.50
Redemption fund	4,205.49
University fund	4,359.69
Interest World's Fair bonds	968.10
Agricultural college	20,000.00
Territorial prison	12,688.13
Capitol building	3,521.91
Capitol interest	6,352.10
Insane asylum improvement	8,517.77
Funding account	5.89
License and inspection fund	3,223.94
Territorial Reform School	239.08
Territorial ranger fund	4,986.20
Territorial prison, improvement	5.57
Territorial Normal School dormitory	5,300.94
	111,075.97

The Territorial funds have been deposited in several of the banks of Arizona for safe-keeping, a sufficient bond in the sum of $50,000 having been provided by each of the banks for the protection and security of the funds so deposited for safe-keeping. The distribution of the Territorial funds in the various banks is as follows:

Deposited in Bank of Arizona, Prescott	$25,000.00
Deposited in The Valley Bank, Phoenix	27,906.84
Deposited in Consolidated National Bank, Tucson	19,746.12
Deposited in The National Bank of Arizona, Phoenix	22,548.02
Deposited in Guarantee Trust Company, New York, to pay past due coupons	15,874.99
	111,075.97

TERRITORIAL AUDITOR.

Statement of warrants drawn on the various funds from July 1, 1901, to July 1, 1902.

GENERAL FUND.

Fund.	Amount.
Territorial prison	$22,865.10
Insane asylum	5,517.10
Live stock sanitary board	6,887.22
Territorial board of equalization	1,334.61
Loan commission	757.25
Contingent expenses (rewards, etc.)	540.30
Governor's office contingencies	246.82
Expenses of the governor	750.00
District judges' salary and expense	5,500.00
Salary:	
Territorial auditor	1,800.00
Citizen member board of control	1,800.00
Territorial treasurer	1,000.00
Attorney-general	1,183.33
Territorial librarian	600.00
Private secretary to the governor	1,425.00
Clerk of board of control	900.00
Adjutant-general	300.00
Assistant Territorial secretary	938.70
Expenses:	
Auditor's office	199.53
Attorney-general's office	69.45
Attorney-general	500.00
Board of control, office	279.55
Board of control, traveling	233.10
Telephone rent, governor and auditor	114.00
Subscription account, Territorial library:	
1899–1900	15.50
1901–2	65.13
Territorial museum	300.00
Relief of Charles D. Poston	420.00
Extra clerk hire, auditor's office	300.00
Education of the deaf and dumb and the blind	1,770.00
Expenses, adjutant-general	174.35
National Guard of Arizona, expense account	1,755.00
Public printing	2,445.08
Publication of Revised Statutes of 1901	3,927.07
Interest on Territorial funding bonds	52,788.48
Total amount drawn on general fund (fiscal year)	119,701.67
Prison fund	30,811.51
Insane asylum fund	28,547.50
Normal school fund	16,675.32
Territorial school fund	29,241.00
Northern Arizona Normal School fund	8,527.04
University fund	20,084.51
Capitol building fund	4,878.45
Insane asylum improvement fund	5,747.61
License and inspection fund	4,835.42
Territorial Reform School fund	15,375.35
Ranger fund	11,217.65
Territorial prison improvement fund	10,112.89
Total amount drawn on the Territorial funds during the fiscal year ending June 30, 1902	305,755.92

Condition of national banks, July 16, 1902.

RESOURCES.

	Loans, discounts, and overdrafts.	Stocks, securities, and claims.	United States bonds and premium.	Cash and due from banks.	United States redemption fund.	Banking-house, furniture, and fixtures.
Consolidated National Bank, Tucson	$439,025.97	$33,995.44	$12,500.00	$473,794.33	$625.00	$20,000.00
Phoenix National Bank, Phoenix	359,002.72	117,210.14	106,690.00	502,245.56	5,000.00	25,391.32
Prescott National Bank, Prescott	390,989.66	30,384.78	50,000.00	202,175.60	2,500.00	50,635.26
Arizona National Bank, Tucson	155,966.63	33,974.69	13,000.00	223,422.21	622.50	12,100.00
The National Bank of Arizona, Phoenix	262,086.74	5,452.19	25,000.00	167,316.09	1,250.00	33,594.62
First National Bank of Clifton	73,774.26	.....	7,500.00	41,141.36	375.00	2,600.00
Tempe National Bank, Tempe	39,667.16	.....	6,593.75	23,831.45	312.50	2,321.40
Total	1,720,513.14	221,017.24	221,283.75	1,633,926.60	10,685.00	146,642.60

Condition of national banks, July 16, 1902—Continued.

LIABILITIES.

	Capital stock.	Surplus and undivided profits.	National bank notes outstanding.	Deposits.	Total.
Consolidated National Bank	$50,000.00	$25,400.94	$12,500.00	$892,039.80	$979,940.74
Phoenix National Bank	100,000.00	67,836.60	100,000.00	847,703.14	1,115,539.74
Prescott National Bank	100,000.00	51,598.99	47,300.00	527,786.31	726,685.30
Arizona National Bank	50,000.00	18,854.65	1,850.00	368,381.38	439,086.03
The National Bank of Arizona	100,000.00	45,424.87	24,500.00	324,774.77	494,699.64
First National Bank of Clifton	30,000.00	3,633.86	7,500.00	84,256.76	125,390.62
Tempe National Bank	25,000.00	341.00	5,950.00	41,435.26	72,726.26
Total	455,000.00	213,090.91	199,600.00	3,086,377.42	3,954,068.33

Condition of Territorial banks, June 30, 1902.

RESOURCES.

	Loans, discounts, and overdrafts.	Stocks, securities, and claims.	Real estate, furniture, and fixtures.	Cash and due from banks.
The Bank of Arizona, Prescott	$487,453.35	$172,348.22	$35,000.00	$334,560.43
The Bank of Bisbee, Bisbee	402,760.50	71,970.00	26,785.01	328,206.85
The Valley Bank, Phoenix	348,859.15	110,387.58	38,490.50	115,978.60
Arizona Central Bank, Flagstaff	330,452.67	21,396.43	32,991.23	103,519.98
International Bank, Nogales	102,392.01	45,100.00	9,227.91	148,640.91
Gila Valley Bank and Trust Co., Solomonville	127,458.47	11,823.42	8,142.47	113,646.20
The Bank of Globe, Globe	178,911.40	20,430.76	10,500.00	59,253.46
Farmers and Merchants' Bank, Tempe	165,372.47	.....	4,517.00	55,646.42
The Bank of Safford, Safford	71,169.84	12,491.80	3,000.00	29,564.35
Old Dominion Commercial Co., Globe	20,684.96	51,451.75	3,500.00	52,112.23
Navajo County Bank, Winslow	50,053.23	.....	1,525.00	21,171.70
The Mesa City Bank, Mesa	51,627.64	1,465.94	5,072.75	20,525.30
Bank of Yuma, Yuma	49,998.72	2,372.00	5,000.00	8,366.68
Home Savings Bank and Trust Co., Phoenix	47,950.73	10,205.65	2,263.27	17,275.14
P. Sandoval & Co., Nogales	22,449.50	23,967.25	1,520.12	40,140.77
E. F. Sanguinetti, Yuma	8.38	23,348.94	.....	2,525.29
Total	2,457,603.02	578,759.74	187,535.26	1,451,134.31

LIABILITIES.

	Capital stock.	Surplus and undivided profits.	Deposits.	Total.
The Bank of Arizona	$50,000.00	$32,500.00	$946,862.00	$1,029,362.00
The Bank of Bisbee	50,000.00	27,828.52	751,893.84	829,722.36
The Valley Bank	100,000.00	31,210.79	482,505.04	613,715.83
Arizona Central Bank	40,000.00	22,556.94	425,803.37	488,360.31
International Bank	50,000.00	17,256.67	238,104.16	305,360.83
Gila Valley Bank and Trust Co	50,000.00	3,393.70	207,676.86	261,070.56
Bank of Globe	25,000.00	28,314.04	215,781.58	269,095.62
Farmers and Merchants' Bank	40,000.00	12,519.50	173,016.39	225,535.89
The Bank of Safford	10,000.00	13,974.20	92,251.79	116,225.99
Old Dominion Commercial Co	22,500.00	38,674.56	66,574.38	127,748.94
Navajo County Bank	10,000.00	1,504.17	61,245.76	72,749.93
The Mesa City Bank	12,500.00	5,121.92	61,069.71	78,691.63
Bank of Yuma	10,000.00	777.70	54,959.70	65,737.40
Home Savings Bank and Trust Co	10,300.00	4,405.02	62,989.77	77,694.79
P. Sandoval & Co	20,000.00	3,419.98	64,657.66	88,077.64
E. F. Sanguinetti	.....	2,564.06	23,318.55	25,882.61
Total	500,300.00	246,021.77	3,928,710.56	4,675,032.33

Condition of building and loan associations, June 30, 1902.

RESOURCES.

	Loans on real estate.	Loans on stock.	Sundry assets.	Real estate.	Cash.
Tucson Building and Loan Association, Tucson.	$198,600.00	.....	$10,099.07	.....	$3,027.66
Citizens' Building and Loan Association, Tucson	201,582.85	$4,910.00	4,698.47	.....	.....
Phoenix Building and Loan Association, Phoenix	129,419.58	.....	8,216.48	$13,242.29	1,141.51
Nogales Building and Loan Association, Nogales	66,910.00	.....	1,190.65	.....	7,866.26
Arizona Mutual Savings and Loan Association, Phoenix	19,150.00	1,394.92	848.35	5,951.60	1,782.92
Arizona Savings and Investment Co., Tucson..	20,150.00	.....	835.95	.....	5,453.58
Total	635,812.38	6,304.92	20,888.97	19,193.89	19,271.93

LIABILITIES.

	Capital stock accumulating.	Undivided profits.	Sundry accounts.	Bills payable.	Total.
Tucson Building and Loan Association	$209,599.68	.....	$2,127.05	.....	$211,726.73
Citizens' Building and Loan Association	187,115.63	$4,337.67	7,738.02	$12,000.00	211,191.32
Phoenix Building and Loan Association	138,672.02	488.24	8,894.55	8,965.00	147,019.81
Nogales Building and Loan Association	71,528.56	4,080.35	358.00	.....	75,966.91
Arizona Mutual Savings and Loan Association.	18,927.82	1,691.34	57.03	2,600.00	23,176.19
Arizona Savings and Investment Co	28,167.80	962.90	3,260.43	.....	32,391.13
Total	654,011.51	11,560.50	17,435.08	18,465.00	701,472.09

ATTORNEY-GENERAL.

Hon. E. W. Wells, attorney-general of Arizona, submits the following report:

Having recently succeeded to the incumbency of the office of attorney-general, my report comprises the condition of the affairs of the office as disclosed by its records.

The business in the office of attorney-general is fairly well closed up to date, the prior year's business having been disposed of, leaving but one case, viz, Louis Wolfley *v.* Nathan O. Murphy, G. W. Vickers, and Charles H. Ackers, comprising the loan commission of the Territory, and John A. Black.

The case was commenced June 26, 1900, in the supreme court of the Territory, the petitioner applying for a writ of mandate on the loan commission to compel payment of an alleged balance due to the petitioner from the Territory, the case having been tried and submitted.

The past history of the case has, no doubt, been fully set forth in the prior reports of this office.

On the 14th instant a suit was commenced in the district court of Graham County, Ariz., wherein one William A. Gillespie is plaintiff and the Territory of Arizona and Graham County are defendants.

The action is brought to quiet title in plaintiff to certain real estate sold for Territorial and county taxes assessed and levied in the county of Graham in the year 1899, the said property under delinquent-tax sale having been sold to the Territory and deed passed for the same.

Process has been served upon the Territory, the interest of which will be cared for.

There are no cases in this office, civil or criminal, undisposed of other than those herein above mentioned.

There are no moneys in the possession of the attorney-general belonging to the Territory or any county in the Territory.

The district attorney of the several counties in the Territory are diligent in the discharge of their official duties, and, so far as our information goes, the public business coming within their charge is efficiently taken care of.

SETTLEMENT OF LANDS.

Two land districts are comprised within the limits of the Territory—one the Gila, located at Tucson, Pima County; the other the Prescott district, located at Prescott, Yavapai County.

The Tucson land district includes the southern portion of the Territory, and embraces 45,318 square miles.

The Prescott land district is in the northern portion, and embraces 68,000 square miles.

Status of lands in the Prescott land district at the close of business June 30, 1902.

[Represented in acres.]

Name of county.	Area unappropriated and unreserved.			Area reserved.	Area appropriated.	Total area of land surface of the county in land district.	Brief description of character of unappropriated and unreserved lands.
	Surveyed.	Unsurveyed.	Total.				
Apache	1,014,219	690,157	1,704,376	3,977,886	1,229,738	6,912,000	Mountainous, arid, grazing.
Coconino	1,229,294	3,327,983	4,557,277	6,440,545	695,178	11,693,000	Mountainous, grazing, timber.
Gila	40,715	1,281,108	1,321,823	392,619	3,558	1,718,000	Arid, broken.
Maricopa	153,448	1,216,243	1,369,691	1,446	3,863	1,375,000	Arid, grazing.
Mohave	983,155	7,394,613	8,377,768	384,790	46,442	8,809,000	Do.
Navajo	1,268,954	643,820	1,912,774	3,395,820	1,012,226	6,320,820	Do.
Yavapai	818,357	3,267,655	4,086,012	520,770	514,218	5,121,000	Mountainous, timber, grazing.
Yuma	.....	1,193,837	1,193,837	201,600	63	1,395,500	Arid, grazing.
Total	5,508,142	19,015,416	24,523,558	15,315,476	3,505,286	43,344,320	

Statement of lands entered at Prescott (Ariz.) land office for fiscal year ending June 30, 1902.

	Number.	Acres.
Original entries:		
Homestead	45	5,931.64
Desert land	4	240
Mineral applications	45	2,737.591
Total	94	8,909.231
Final entries:		
Homestead	42	5,645.48
Commuted cash, including excess	13	1,230.47
Desert land	1	40
Mineral land	45	2,152.928
Railroad selections	697	386,165
Indian allotments	4	560
Total	802	395,793.878

Status of lands in Tucson land district at the close of business on June 30, 1902.

[Represented in acres.]

County.	Area unappropriated and unreserved.			Reserved.	Appropriated.	Total area in county.	Entered.	Canceled.
	Surveyed.	Unsurveyed.	Total.					
Apache	21,206	18,009	39,217	204,980	2,805	247,000		
Cochise	1,494,243	2,067,042	3,561,285	132,599	288,116	3,982,000	19,241	7,020
Gila	14,469	96,208	110,675	1,067,301	33,522	1,211,500	552	160
Graham	795,204	2,051,368	2,846,572	1,010,000	281,428	4,138,000	6,055	3,816
Maricopa	1,000,844	2,317,745	3,318,589	538,600	568,811	4,426,000	3,789	4,832
Navajo				70,000		70,000		
Pima	988,186	4,317,146	5,305,332	413,074	449,094	6,167,500	6,114	2,356
Pinal	468,876	2,079,795	2,548,671	684,328	241,501	3,474,500	79	753
Santa Cruz	229,342	319,217	548,559	222,917	28,024	799,500	2,270	560
Yuma	635,834	3,855,370	4,491,204	65,442	375,354	4,932,000	18,441	7,750
Total	5,648,204	17,121,900	22,770,104	4,409,241	2,268,655	29,448,000	56,541	27,247

INTERNAL REVENUE.

The internal-revenue taxes collected in Arizona during the fiscal year ended June 30, 1902, amounted to the sum of $38,882.38.

CUSTOMS.

The collector of customs of the port of Nogales, Ariz., makes the following report of the imports and exports during the year ended June 30, 1902:

Value of domestic exports	$4,947,409.00
Value of foreign exports	5,125.00
Value of imports free of duty	8,807,125.00
Value of dutiable imports	410,277.00
Amount of duty collected	144,768.91
Value of goods shipped under warehouse and transportation bonds	573,494.00

IRRIGATION AND AGRICULTURE.

In this Territory these terms should be indissolubly linked together, as all success in agriculture depends entirely upon irrigating enterprises carried to a successful conclusion.

Arizona contains within its borders 10,000,000 acres of land susceptible to irrigation, of which amount 1,000,000 acres have been utilized for farms and homes, and to the reclamation of which the available water supply, the natural flow of streams, has been applied to its fullest extent. In many instances an endeavor has been made to reclaim too much land for the natural surface flow, which, coupled with the drought of the last few years, has brought about a new condition of affairs in the agricultural interests of the Territory, giving rise to the question how to best secure an added water supply which will not only furnish the required amount to properly irrigate those lands already reclaimed, but which will, in addition, allow the reclamation of thousands of acres now lying dormant. This new condition will be met in the future by the enforcement of that law passed at the last session of the Congress and approved by the President of the United States, commonly known as the Hansbrough-Newlands Act. This law, which is given below in full, will ultimately be of the greatest bene-

fit to the arid West, as by its application new homes will be established for citizens of the United States by the reclamation of the major portion of that arid domain now valueless as a source of revenue or as an abiding place for the surplus population.

THE HANSBROUGH-NEWLANDS MEASURE.

AN ACT appropriating the receipts from the sale and disposal of public lands in certain States and Territories to the construction of irrigation works for the reclamation of arid lands.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That all moneys received from the sale and disposal of public lands in Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming, beginning with the fiscal year ending June thirtieth, nineteen hundred and one, including the surplus of fees and commissions in excess of allowances to registers and receivers, and excepting the five per centum of the proceeds of the sales of public lands in the above States set aside by law for educational and other purposes, shall be, and the same are hereby, reserved, set aside, and appropriated as a special fund in the Treasury to be known as the "reclamation fund," to be used in the examination and survey for and the construction and maintenance of irrigation works for the storage, diversion, and development of waters for the reclamation of arid and semiarid lands in the said States and Territories, and for the payment of all other expenditures provided for in this act: *Provided,* That in case the receipts from the sale and disposal of public lands other than those realized from the sale and disposal of lands referred to in this section are insufficient to meet the requirements for the support of agricultural colleges in the several States and Territories, under the act of August thirtieth, eighteen hundred and ninety, entitled "An act to apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts, established under the provisions of an act of Congress approved July second, eighteen hundred and eighty-two," the deficiency, if any, in the sum necessary for the support of the said colleges shall be provided for from any moneys in the Treasury not otherwise appropriated.

SEC. 2. That the Secretary of the Interior is hereby authorized and directed to make examinations and surveys for, and to locate and construct, as herein provided, irrigation works for the storage, diversion, and development of waters, including artesian wells, and to report to Congress at the beginning of each regular session as to the results of such examinations and surveys, giving estimates of cost of all contemplated works, the quantity and location of the lands which can be irrigated therefrom, and all facts relative to the practicability of each irrigation project; also the cost of works in process of construction, as well as of those which have been completed.

SEC. 3. That the Secretary of the Interior shall, before giving the public notice provided for in section four of this act, withdraw from public entry the lands required for any irrigation works contemplated under the provisions of this act, and shall restore to public entry any of the lands so withdrawn when, in his judgment, such lands are not required for the purposes of this act; and the Secretary of the Interior is hereby authorized, at or immediately prior to the time of beginning the surveys for any contemplated irrigation works, to withdraw from entry, except under the homestead laws, any public lands believed to be susceptible of irrigation from said works: *Provided,* That all lands entered and entries made under the homestead laws within areas so withdrawn during such withdrawal shall be subject to all the provisions, limitations, charges, terms, and conditions of this act; that said surveys shall be prosecuted diligently to completion, and upon the completion thereof, and of the necessary maps, plans, and estimates of cost, the Secretary of the Interior shall determine whether or not said project is practicable and advisable, and if determined to be impracticable or unadvisable he shall thereupon restore said lands to entry; that public lands which it is proposed to irrigate by means of any contemplated works shall be subject to entry only under the provisions of the homestead laws in tracts of not less than forty nor more than one hundred and sixty acres, and shall be subject to the limitations, charges, terms, and conditions herein provided: *Provided,* That the commutation provisions of the homestead laws shall not apply to entries made under this act.

SEC. 4. That upon the determination by the Secretary of the Interior that any irrigation project is practicable, he may cause to be let contracts for the construction of the same, in such portions or sections as it may be practicable to construct and

complete as parts of the whole project, providing the necessary funds for such portions or sections are available in the reclamation fund, and thereupon he shall give public notice of the lands irrigable under such project and limit of area per entry, which limit shall represent the acreage which, in the opinion of the Secretary, may be reasonably required for the support of a family upon the lands in question; also of the charges which shall be made per acre upon the said entries, and upon lands in private ownership which may be irrigated by the waters of the said irrigation project, and the number of annual installments, not exceeding ten, in which such charges shall be paid and the time when such payments shall commence. The said charges shall be determined with a view of returning to the reclamation fund the estimated cost of construction of the project, and shall be apportioned equitably: *Provided*, That in all construction work eight hours shall constitute a day's work, and no Mongolian labor shall be employed thereon.

SEC. 5. That the entryman upon lands to be irrigated by such works shall, in addition to compliance with the homestead laws, reclaim at least one-half of the total irrigable area of his entry for agricultural purposes, and before receiving patent for the lands covered by the entry shall pay to the Government the charges apportioned against such tract, as provided in section four. No right to the use of water for land in private ownership shall be sold for a tract exceeding one hundred and sixty acres to any one landowner, and no such sale shall be made to any landowner unless he is an actual bona fide resident on such land, or occupant thereof, residing in the neighborhood of said land, and no such right shall permanently attach until all payments therefor are made. The annual installments shall be paid to the receiver of the local land office of the district in which the land is situated, and a failure to make any two payments when due shall render the entry subject to cancellation, with the forfeiture of all rights under this act, as well as of any moneys already paid thereon. All moneys received from the above sources shall be allowed the usual commissions on all moneys paid for lands entered under this act.

SEC. 6. That the Secretary of the Interior is hereby authorized and directed to use the reclamation fund for the operation and maintenance of all reservoirs and irrigation works constructed under the provisions of this act: *Provided*, That when the payments required by this act are made for the major portion of the lands irrigated from the waters of any of the works herein provided for, then the management and operation of such irrigation works shall pass to the owners of the lands irrigated thereby, to be maintained at their expense under such form of organization and under such rules and regulations as may be acceptable to the Secretary of the Interior: *Provided*, That the title to and the management and operation of the reservoirs and the works necessary for their protection and operation shall remain in the Government until otherwise provided by Congress.

SEC. 7. That where in carrying out the provisions of this act it becomes necessary to acquire any rights or property, the Secretary of the Interior is hereby authorized to acquire the same for the United States by purchase or by condemnation under judicial process, and to pay from the reclamation fund the sums which may be needed for that purpose, and it shall be the duty of the Attorney-General of the United States, upon every application of the Secretary of the Interior under this act, to cause proceedings to be commenced for condemnation within thirty days from the receipt of the application at the Department of Justice.

SEC. 8. That nothing in this act shall be construed as affecting or intending to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this act, shall proceed in conformity with such laws, and nothing herein shall in any way affect any right of any State or of the Federal Government or of any landowner, appropriator, or user of water in, to, or from any interstate stream, or the water thereof: *Provided*, That the right to the use of water acquired under the provisions of this act shall be appurtenant to the land irrigated, and beneficial use shall be the basis, the measure, and the limit of the right.

SEC. 9. That it is hereby declared to be the duty of the Secretary of the Interior in carrying out the provisions of this act, so far as the same may be practicable and subject to the existence of feasible irrigation projects, to expend the major portion of the funds arising from the sale of public lands within each State and Territory hereinbefore named for the benefit of arid and semiarid lands within the limits of each State or Territory: *Provided*, That the Secretary may temporarily use such portion of said funds for the benefit of arid or semiarid lands in any particular State or Territory hereinbefore named as he may deem advisable, but when so used the excess shall be restored to the fund as soon as practicable, to the end that ultimately and in any event, within each ten-year period after the passage of this act, the expenditures

for the benefit of the said States and Territories shall be equalized according to the proportions and subject to the conditions as to practicability and feasibility aforesaid.

SEC. 10. That the Secretary of the Interior is hereby authorized to perform any and all acts and to make such rules and regulations as may be necessary and proper for the purpose of carrying the provisions of this act into full force and effect.

Approved June 17, 1902.

ANNUAL RAINFALL IN ARIZONA.

In conjunction with the above bill is here given the annual rainfall in the Territory for the last several years, and upon which to such a great extent depends the successful carrying out of the provisions of the bill.

Average annual precipitation for rainfall stations in Arizona far the period 1859–1901.

Stations.	Latitude.	Longitude.	Elevation.	Record.		Years (inclusive).	Average annual precipitation.
				From—	To—		
	° ′	° ′	*Feet.*				*Inches.*
Flagstaff	35 12	111 37	6,907	1888	1901	5	24.39
Fort Apache	33 40	109 45	5,600	1872	1901	26	18.74
Fort Bowie	32 08	109 23	4,781	1867	1894	25	14.95
Fort Defiance	35 43	109 10	6,500	1889	1901	12	13.12
Fort Grant	32 36	109 53	4,780	1866	1901	29	14.76
Fort Huachuca	31 20	110 20	4,785	1886	1901	16	15.94
Fort Mohave	35 02	114 36	600	1859	1901	24	5.62
Gila Bend	32 59	112 46	737	1890	1901	11	5.05
Holbrook	34 55	110 10	5,047	1887	1900	13	8.06
Maricopa	33 08	112 02	1,190	1875	1901	21	5.37
Natural Bridge	34 26	111 34	4,990	1890	1901	12	21.12
Phoenix	33 28	112 00	1,108	1876	1901	18	6.92
Prescott	34 33	112 28	5,318	1865	1901	30	15.30
San Carlos	33 16	110 27	3,456	1881	1901	20	11.95
Signal	34 22	113 35	1,652	1889	1901	12	6.98
Texas Hill	32 48	113 40	355	1879	1900	17	3.17
Tucson	32 14	110 54	2,404	1867	1901	34	11.37
Williams	35 10	112 02	6,700	1888	1899	6	16.81
Yuma	32 44	114 36	141	1875	1901	25	2.88

WATER STORAGE.

Various causes have combined to facilitate the flow to the channels of the streams, the rainfall that annually comes to the Territory preventing the percolation that insures a permanent water supply, and causing instead torrential floods during both the winter and summer storms. Among these causes may be mentioned the destruction of the forests by fire and otherwise, the depletion of the grasses on the range by overstocking, and consequent treading out of the same. The question now arises as to the best method to control these flood waters and to hold the same in reservoirs for use during the season when most needed. The question is answered by the terms of the Hansbrough-Newlands bill, which allows, under direction of the honorable Secretary of the Interior, the proceeds from the sales of Government lands in the several States and Territories comprising the arid belt, to be used for the construction of artificial reservoirs by means of dams for the purpose of impounding the flood waters now wasting down the different streams, the same to be used at convenient seasons and when needed in irrigating lands lying below.

At no time in the history of the West has so beneficial a law for the

arid belt been placed upon the statute books as that above quoted, and as the years go by its benefits will be appreciated to a greater extent.

Being cumulative in its effect the operations under it will grow from year to year, and new homes for thousands gradually established. Eventually as the true workings of the system shall become known and appreciated by the whole people of our common country, when appropriations shall be needed for the hastening of any enterprise under this head, they will be forthcoming as readily and willingly as have been appropriations for other matters of public benefit, and no enterprise can be of better public policy than the furnishing of homes for the citizens of the country at large.

Arizona contains within its boundaries many drainage areas of large extent, all possible of utilization under the terms of the Hansbrough-Newlands act.

Notable among these are the basins of the Gila, the Salt, the San Pedro, the Santa Cruz, the Verde, Bill Williams Fork, and the Hassayampa rivers. The Gila being supplied from the largest and most extensive watershed is in consequence the most important of all streams lying wholly or almost wholly in the Territory. Nearly all other streams mentioned are tributary directly or indirectly to the Gila, and have each irrigated areas of their own. On all can be found available reservoir sites eventually to be used, under the law, for the reclamation of the arid lands tributary thereto.

Artificial reservoirs should meet certain conditions and be peculiarly fitted by nature, in order that the cost of construction of the necessary works will be in reasonable proportion to the value of the water stored, and these conditions nature has complied with in many sites on the different streams mentioned as having extensive drainage areas, and which secure their water supply from the high mountain ranges. Notable among these are the San Carlos reservoir site on the Gila River, the reservoir site at the Buttes on the same stream, and what is known as the Tonto reservoir site on Salt River, these having in the past been called to the attention of the Government, and reliable data obtained in each case on which estimates can be based.

Arizona lays claim to a just and proportionate share of the benefits to accrue from the application of the act establishing Government aid for irrigation, for the reason that nowhere else can be found a more productive soil or so large areas that can be made ready for irrigation with so small an expenditure, and a climate so mild as to allow the successful cultivation of all semitropical plants, which, in conjunction with the fertility of the soil, produces so great a quantity of value per acre per year.

It is but just that Arizona should ask that the new system be inaugurated within her borders; that the most available and valuable site be selected for the initial movement; that when a site be selected it be considered in its bearing upon a further and greater extension into a system of reservoirs upon this stream of sufficient capacity to control and impound all flood waters and thus assure the reclamation of all the arid land possible. On all the smaller as well as on the larger streams similar systems can be established, so that eventually by the operation of this law alone the greater part of the available land of the Territory will be included in the irrigated area.

It is well that the General Government should retain control of the reservoir sites and improvements until such time as, under proper restrictions, the title shall pass to those owning the lands irrigated, and should, through its agents, see to the equitable distribution of the stored waters, to the end that the greater good shall come to the greater number.

Irrigation has been carried on in Arizona since prehistoric times, as is attested by the ruins of ancient canals, and villages once peopled by possibly a million souls of a prehistoric race who depended for their sustenance to a great extent upon agriculture; and there is no reason why in the future, under a proper system of reservoirs, there should not be again, even greater in numbers, a prosperous and contented people benefited and enriched by the products of the soil.

The conservation of flood waters should be attended by a proper and equitable division and by a supervision that insures the doing of its full duty by every acre-foot when distributed to the land.

Government aid to irrigation enterprise is not new and untried, as is witnessed by the system established in India under government control, and that great system lately established in the valley of the Nile, in Egypt, which is but lately or about to be completed. Equal, if not greater, success will attend should water storage be an accomplished fact in Arizona.

To the conservation of the flood waters the agricultural interests of the Territory must look for their salvation.

RAINFALL IN PHOENIX.

The statement below was submitted by Mr. William G. Burns, section director at Phoenix:

The rainfall for the year ended June 30, 1902, was deficient or below the seasonal average for all the months except July, October, and May, and there was the attending decreased waterflow in the irrigating streams during the months of deficient rainfall. By months the departures from the normal were as follows:

Month.	Departure.	Month.	Departure.
	Inch.		*Inch.*
July	+0.64	January	−0.31
August	− .55	February	− .61
September	− .55	March	− .32
October	+ .15	April	− .32
November	− .34	May	+ .02
December	− .89	June	− .09

During the first and second decades of July plant growth was partially arrested on account of unseasonably high temperature, deficient rainfall, and a diminished supply of water in the irrigating canals. These adverse conditions were accentuated in some localities by high, drying winds.

General rains of generous proportion occurred during the last week in July, and by August 1 the irrigating streams showed a marked rise. The waterflow was maintained throughout the month in sufficient quantity to serve all the requirements of the irrigated districts.

The beginning of a protracted drought and deficient rainfall on the watersheds of the irrigating streams began about the second decade of September. Conditions of insufficient water supply obtained for the remainder of the year ended June 30, 1902.

In the month of March, 1902, a bulletin was issued from this office showing the

snowfall for the month of February, 1902, and a comparative table showing the snowfall of the corresponding month in 1901. The table is here reproduced:

Snowfall in inches.

Station.	1901.	1902.
	Inches.	*Inches.*
Flagstaff	84.3	13.1
Fort Huachuca	5.5	0
Natural Bridge	21.0	0
Oracle	15.0	0
Pinal Ranch	10.0	0
Prescott	25.0	Trace.
Showlow	29.0	Trace.
Yarnell	13.0	Trace.

The snowfall during the winter months furnishes in great measure the supply of water for the steady flow of streams. The greatly reduced amount of water available for irrigation during the season, from January 1 to June 30, 1902, was obviously caused by total lack of snowfall during the winter months.

RAILWAYS.

Railway building during the past year has been more active, generally, than any year in the history of the Territory. The El Paso and Southwestern Railway has been built into this Territory from El Paso to Bisbee, and through trains are now running to Bisbee over this line. Freight and passenger rates have been materially lowered owing to the competing line entering southeastern Arizona, and that portion of the Territory has been greatly benefited.

The Tombstone branch of the El Paso and Southwestern Railway is now being constructed, running from Fairbank, on the Arizona and Southeastern Railway, to Tombstone. This road will be extended to College Peak, where connection will be made with the main line of the El Paso and Southwestern. Tombstone, the county seat of Cochise County, will be given the advantages of railroad transportation early during the present winter.

Reports have been received of progress made during the year from numbers of railway companies operating roads in Arizona, and I have the honor to submit below some of the statements.

Arizona and New Mexico Railway.—The Lordsburg and Hachita Railway was completed in June of the present year. This road is an extension of the Arizona and New Mexico Railway, and is 38½ miles in length. It runs from Lordsburg to Hachita, N. Mex., where it joins the El Paso and Southwestern Railway. This railway is owned by the Arizona and New Mexico Railway Company, with headquarters in Clifton, Ariz. During the present year no changes were made in the Arizona and New Mexico Railway. This road in May of last year was changed from 36 inch to standard gauge. The road is 71 miles long, 41 miles in Arizona and 30 miles in New Mexico.

Arizona and Utah Railway.—This road runs from McConnico Junction, on the Santa Fe Pacific Railway, to Chloride, in Mohave County. No extension of the road has been made during the past year. The roadbed has been improved, new bridges constructed, and new and larger engines added to the equipment of the road. Superintendent N. W. Tarr reports that the shortage of water for mill purposes at Chloride has decreased the traffic somewhat, but the further develop-

ment of water will soon eliminate this obstacle. This railway enters a remarkably rich mining region, and will no doubt be extended as new mining districts are opened to production.

Grand Canyon Railway.—The passenger business of this new line of railway has wonderfully increased during the past year, owing to extensive advertising in Eastern States of the wonders of the Grand Canyon of the Colorado River in Arizona. This railway runs from Williams, on the Santa Fe Pacific, to the Grand Canyon, and thousands of tourists have availed themselves of the opportunity of an all-rail trip to the canyon. General Manager A. G. Wells of this road reports that the physical condition of the Grand Canyon Railway has been much improved during the year, heavy repairs having been made upon all of the bridges; tie plates applied to a large number of the ties, many of which have also been renewed; new water station facilities at the Grand Canyon installed, and heavy general track repairs made.

Santa Fe, Prescott and Phoenix Railway.—Mr. J. H. Emmert, assistant to the president, reports as follows upon the progress made by the Santa Fe, Prescott and Phoenix Railway during the past year:

During the fiscal year which ended June 30, 1901, and the fiscal year which ended June 30, 1902, this company constructed 23 miles of track known as the Hell Canyon Cut-Off, at a net cost of approximately $250,000. This cut-off was for the purpose of improving the grade and alignment and reducing the length of the main line. It reduced the distance 3 miles; the maximum south-bound grade from 1 per cent to three-fourths of 1 per cent; the north-bound grade from 3 per cent to 1½ per cent; the curvature from a maximum of 12 degrees to a maximum of 6 degrees, and the total degrees of curvature from 4,100.7 to 1,476.8 degrees. On the old line there were 40 wooden pile and trestle bridges, 21 of which were very high, while on the new line there are only 9, and only 1 of any considerable height. The new line has 1 steel viaduct across Hell Canyon, which is 169 feet high and 650 feet long, and rests on concrete piers. This cut-off reduces the time of our passenger trains about thirty minutes, and freight trains from one to two hours, and the cost of operation to a considerable extent.

This company also laid about 10 miles of 65-pound rails on the main line south of Prescott, replacing 56-pound rails. This replacement was on heavy grades, the rails released being needed for extensions.

During the fiscal year ended June 30, 1902, the Bradshaw Mountain Railroad Company constructed a branch road connecting with the Prescott and Eastern Railroad near Huron, running up Big Bug Creek to the Poland mine, a distance of 7.8 miles. This company has also completed 5 miles of track from Mayer in the direction of Crowned King, and is also constructing 11 miles more in the same direction, and expects to have completed the 16 miles in the course of six or eight months.

This management has also under consideration the construction of other branches into other meritorious mining districts, and will continue its policy of building such branches as soon as the development is sufficient to warrant.

The above covers all of the improvements that have been made to our property that are of sufficient importance to mention, and also of the construction of new branches which this company owns and will operate.

Phoenix and Eastern Railway.—This is a projected railway from Phoenix to Benson, right of way for which is now being secured with success by agents of the company, aided by the citizens of Phoenix, Mesa, and other cities which will be benefited by such a road.

The Phoenix and Eastern Railroad will be 180.8 miles long, and will extend from Phoenix through Tempe, Mesa, thence to a point on the Gila River opposite Florence, thence up the Gila and San Pedro through Kelvin, Riverside, Dudleyville, and Mammoth to Benson. Its construction will afford an unlimited market for all of the products of the Salt River Valley and of the Gila in the neighborhood of Florence. It will also admit of the development of very rich mineral districts from Florence to Benson on both sides of the rivers named. Already the

development has increased in this section in anticipation of the construction of the road. A great number of the mines in the neighborhood of Kelvin produce that character of ore which requires smelting for profitable treatment, and the construction of this road will enable owners to secure fuel at a cost that will permit of their operating their properties, which they can not now do without loss. This road will give Phoenix another connection with the East and with the South. At Benson it will connect with the El Paso and Southwestern Railroad as well as with the Southern Pacific system.

Santa Fe Pacific Railway.—This great transcontinental railway passes across the northern portion of Arizona. In years past great sums of money were spent to make this road complete in every particular, and during the past year only additional improvements were made such as the constant operation of a great system necessitates. Passing tracks have been lengthened, and many miles of new tracks have been installed in Arizona to facilitate the movement of trains. Ballasting and the laying of new rails has occupied the attention of the company upon its Arizona tracks during the past year.

Gila Valley, Globe and Northern Railway.—This is one of the important railways of Arizona. It enters rich mining and agricultural regions and terminates at Globe, one of the largest of the copper camps of Arizona. The road passes through the fertile Gila Valley, which is extensively cultivated, and great quantities of hay, grain, and other products of the valley find an outlet to larger markets through this railway.

Southern Pacific Railway.—Mr. C. C. Sroufe, superintendent of the Tucson division of the Southern Pacific Railway submits the following report:

The Southern Pacific Company has adopted the policy of making general improvements in its track and yard facilities at terminal points, replacing all of its lighter rails with heavy 80-pound steel, thus enabling them to handle their tracks with greater dispatch and less expense for repairs to the track. This has involved the changing of about 80 miles of rail, at a cost of over $300,000.

The recent explorations made by us in the development of water for locomotive use at Benson, Ariz., resulted in striking an artesian flow approximating 3,000 gallons per hour, at a depth of about 500 feet, the water being of a very fair quality. It is the intention of the company to drill one or more deep wells at Gila Bend, Ariz., to a depth of 2,000 feet if necessary, to determine the possibility of procuring a good supply of water at that point. The present supply is very inferior, containing a large percentage of incrustating and corrosive elements.

At Casa Grande we recently developed an excellent supply of water at a depth of 580 feet. It is proposed to drill a number of experimental shallow wells, with a view to developing the water supply at various points on the division. The lack of a suitable water supply is one of the great drawbacks to our operations in this Territory, as nearly all the water is highly charged with incrustating matter and very hard on locomotive boilers.

Last year this company experienced a very severe washout on the New Mexico and Arizona branch line, running from Benson to Nogales, resulting in a complete loss of 10 miles of track and an interruption of traffic for several days. The company has profited by its experience in this washed-out district by building the reconstructed line in more favorable locations and erecting several steel bridges, insuring themselves, in a measure, against a repetition of such a disaster.

The question of new shops at Tucson is now under consideration, and should it be decided to erect them it will give a large increase in the present facilities, with corresponding benefits to the community, the desirability of which can not be overestimated.

The transcontinental freight traffic has shown very favorable increases over preceding years, and has necessitated the replacing of the old style of engines with the most modern compound-cylinder type of locomotive, thus enabling the company to handle longer and heavier trains and make better time. The efficiency of the freight

service is excellent, the average time required to handle freight between San Francisco and New Orleans, a distance of about 2,500 miles, being seven days and seven hours, which includes all delays from regular stops and other incidental causes.

The possibility of inaugurating a double daily passenger train service through the Territory is under consideration, and would be a great accommodation to the public if inaugurated.

The company adopted oil for locomotive fuel instead of coal, replacing the coal-burning engines with oil burners as rapidly as possible. Oil as a fuel has been found more economical than coal, and is cleaner, makes a hotter fire, and is much easier to handle. This has necessitated the building of large oil-storage reservoirs at different points on this division, with a capacity running from 1,250,000 to 2,000,000 gallons each. These reservoirs feed the oil direct to the engine tenders through large column pipes, a minimum amount of labor being involved.

The gross earnings of the company in the Territory show a corresponding increase with the volume of business handled, and I regret that I have not available the figures for giving you accurate data on the subject.

El Paso and Southwestern Railway.—Mr. W. G. Choate, general superintendent and traffic manager of the El Paso and Southwestern Railway, submits the following report:

At the close of the year ending June 30, 1902, there were in operation on this system 133.96 miles of main line and 16.06 miles of siding, making a total of 150.02 miles.

New line completed during the year was 41.12 miles; old track relaid was 4 miles; weight of steel used, 60 and 65 pounds, respectively. Grading and laying various spurs at Douglas and Bisbee for convenience and betterment of the service, 10 miles; surveys made for straightening the line between Forrest and Naco, 15 miles; between Lewis Springs and Naco, 23 miles. There has been erected during the year a round-house and railroad shops at Douglas; also many permanent buildings and a general office added for our operating forces at that point.

In addition to the foregoing, this company has expended during the year in Arizona, in the way of obtaining the necessary supply of water, houses for its laborers engaged in track service, coal bins, powder houses, station buildings, etc., an amount considerably in excess of $50,000.

Since the close of the year above named the same interests have also let contracts for the building of a branch road from Fairbank to Tombstone, a distance of 10.23 miles, and the actual work on this branch is now in active progress and we hope to have the road ready for operation not later than January 1, 1903.

Maricopa and Phoenix and Salt River Valley Railroad.—This road is the connecting link of the Southern Pacific system with the Salt River Valley. The distance from Maricopa, where the road connects with the Southern Pacific, to Phoenix is 35 miles. A branch line from Tempe to Mesa City is 8 miles in length.

The company operates 4 large locomotives and 67 cars, this embracing the entire rolling facilities. The road is of standard gauge. The company maintains a shop at Phoenix, where all of the repair work is done with the exception of the heaviest character.

Improvements have been made during the year upon the tracks of the company, and $35,000 have been expended in repairing bridges on the Gila and Salt rivers. A fine structure has been built by the company across the Salt River, consisting of nine spans, known as the Pratt truss, a combination wood and steel bridge. It is 1,600 feet in length, with its approaches.

The traffic of the road has been very heavy during the past season in cattle, horses, hogs, hay, and grain. During the year there have been shipped over this road, for delivery in southern California, 20,000 or 25,000 head of beef cattle. Shipments of cattle would have been much greater had it not been for the drought. A large number of the cattle brought to the Salt River Valley from mountain ranges failed to

fatten on account of the scarcity of feed. Phoenix, Tempe, and Mesa are the stock, hay, and grain shipping points. During the past year Tempe exceeded in the number of cattle shipped out.

The passenger service of the road at the present time is one round trip a day between Maricopa and Phoenix. The Southern Pacific Company will double its daily passenger service during the present fall and winter, which will necessitate, in all probability, a double passenger service between Phoenix and Maricopa in order to accommodate the passenger service on the other line. The Maricopa and Phoenix and Salt River Valley Railroad is operated independently, although its connections and affiliations are with the Southern Pacific Company, it being the outlet of that road to the Salt River Valley. A double daily service between Mesa and Phoenix is maintained. Mesa is one of the most flourishing districts of the valley, and the stock industry is carried on there extensively.

The tourist travel last winter was above the average, and the prospect of its being beyond anything that has been known heretofore is excellent for the fall and winter months of the present year. Numbers of people every winter come to the Salt River Valley to gain the benefit of the mild and health-giving climate.

Offices for the operation of the road are maintained in Phoenix under the direction of Mr. B. F. Porter, general superintendent. The president, Mr. Francis Cutting, who is also president of the Cutting Packing Company, in San Francisco, and the board of directors have their offices in San Francisco.

The roads now in operation in the Territory are as follows:

	Gauge.	Miles.
	Feet.	
Southern Pacific of Arizona, extending along the southern part of the Territory from Yuma, on the Colorado River, to the eastern boundary of Cochise County, passing through the counties of Yuma, Maricopa, Pinal, Pima, and Cochise	4.8½	383
Santa Fe Pacific, crossing north of the center of the Territory, near the thirty-fifth parallel, and passing through the counties of Apache, Navajo, Coconino, Yavapai, and Mohave	4.8½	393
Santa Fe, Prescott, and Phoenix, running from Ash Fork, on the line of the Santa Fe Pacific, through the counties of Yavapai and Maricopa, to Phoenix	4.8½	197
Gila Valley, Globe, and Northern, running from Bowie, on the Southern Pacific, in Cochise County, to Globe, Gila County	4.8½	140
New Mexico and Arizona, running from Benson, on the Southern Pacific, in Cochise County, to Nogales, in the same county, at the Mexican line	4.8½	87
Arizona and New Mexico, running from Clifton, in Graham County, to the Southern Pacific, at Lordsburg, N. Mex	4.8½	71
Arizona and Southeastern, running from Bisbee, Cochise County, to Benson, on the Southern Pacific, in the same county	4.8½	54
Maricopa and Phoenix and Salt River Valley, running from Maricopa, Pinal County, on the Southern Pacific, to Phoenix, Maricopa County, with a branch from Tempe, Maricopa County, to Mesa, in the same county	4.8½	43
Prescott and Eastern, running from a point on the Santa Fe, Prescott, and Phoenix, Yavapai County, to Mayer, in the same county	4.8½	27
United Verde and Pacific, running from Jerome Junction, on line of Santa Fe, Prescott, and Phoenix Railway, to Jerome Junction, Yavapai County	3	26
Congress Gold Company, running from Congress Junction, on the Santa Fe, Prescott, and Phoenix, in Yavapai County, to the Congress mine	4.8½	4
Arizona and Utah, running from McConnico Junction, on the Santa Fe Pacific, in Mohave County, to Chloride, in the same county	4.8½	23
The Southeastern, from Don Louis Station, on the Arizona and Southeastern Railway, to Douglas, on the boundary line between Mexico and the United States	4.8½	22½
A branch of the Arizona and Southeastern, from Don Louis Station to Naco	4.8½	6
The Morenci Southern, from Guthrie, on the Arizona and New Mexico, to Morenci	3	18
The Santa Fe and Grand Canyon, from Williams, on the Santa Fe, to the Grand Canyon of the Colorado	4.8½	64
El Paso and Southwestern, entering Arizona at the eastern border of Cochise County and passing Southwest to Bisbee, Naco	4.8½	150

FORESTS AND LUMBER MANUFACTURE.

In the northern portion of Arizona are the largest pine forests in the United States, covering an almost unbroken area of 10,000 square miles. Coconino County contains the greatest forest area, although Yavapai, Apache, and Gila also have great forests. Reserves of forests have been made by the Government, thus providing for the greatest possible safety from destruction by fires and the cutting of trees without consent and according to rules laid down by the Government.

The lumber industry, therefore, is carried on wholly in these northern counties of the Territory. There are a number of small mills in some of the smaller pine forests of southern Arizona, such as the Huachucas, Pinal Mountain, the Chiricahuas, and quantities of lumber and timbers are manufactured for local uses.

Flagstaff and Williams contain the principal lumber mills in Arizona, and their equipment is first-class in every particular. The Arizona Lumber and Timber Company, of Flagstaff, and the Saginaw and Manistee Lumber Company, at Williams, operate large plants, and the manufacture of lumber at these points is carried on very extensively. In order to properly present the progress made during the past year, I have the honor to submit herewith statements received from the managers of these lumber companies.

Arizona Lumber and Timber Company, Flagstaff.—Mr. M. J. Riordan, secretary of this company, submits the following report:

In relation to our operations we would say that during the year named the volume of our business has been unprecedented. During all the summer of 1901, and beginning with March, 1902, our principal mill has been operated day and night on ten-hour shifts, and our auxiliary mill, 15 miles from Flagstaff, has been working on a ten-hour shift continuously. In addition to this, during the present season we have been operating our box factory day and night, a thing that was never before attempted by us. The volume of our trade, particularly in box and cut-up material, so greatly increased during the year that we found it necessary to make an addition to our box factory and planery of a building 50 by 155 feet, with a corresponding increase of machinery. We had anticipated when this was done that it would not be necessary to run this part of our plant day and night, but the result has not justified our anticipations, as even with the additions made we can now barely keep abreast of the demands. The limits of our trade, because of the peculiar conditions of the eastern lumber market, have extended to points which, a few years ago, it would have been thought beyond the possibilities of an Arizona institution ever reaching. The denudation of the white-pine forests of Michigan and Wisconsin and the increased demand for this class of material have brought about the curious situation that dealers in white pine are now looking to the Pacific coast to make up the deficit in their natural sources of supply. In consequence of these conditions, we have been called upon during the last eight months for shipments of our material to all parts of Kansas, Muscatine (Iowa), St. Louis (Mo.), Janesville and Oshkosh (Wis.), Chicago, and Yonkers and Tonowanda (N. Y.). Of course this new market absorbs only certain grades of our product, mainly such as can be worked into sash and door stock. How long the condition now existing will prevail can not be determined, but it is to be presumed that the market opened up for Arizona pine will constantly widen rather than diminish.

During several years past, but particularly during the last, a broad market, heretofore supplied from Arkansas, Iowa, and, to some extent, Wisconsin and Texas, has opened up for us in the supply of boxes of various kinds, and particularly of cantaloupe crates, in Colorado, Kansas, and Texas. Our cantaloupe crate particularly has been shipped very largely to the Rocky Ford district of Colorado, where, on account of the superior class of material and the excellence of the manufacture, it has been preferred, even at a higher price, to the product coming from other States. We believe that it is greatly to the credit of Arizona to be able to say that the quality of workmanship put into the material which it is shipping has given it a preference over States which have always been furnishing such material heretofore. In other

words, we might answer the query, "Can any good come out of Arizona?" positively and unqualifiedly in the affirmative.

The main body of our box shipments has gone to California, into which State we have thus far this year shipped more pine boxes than any concern on the Pacific coast, with a single exception, and there is at the present date only a small margin between ourselves and this other concern.

It may be of interest to know that the Saginaw and Manistee Lumber Company, at Williams, and ourselves have during this year shipped six cars of boxes to the Rhodes fruit farm, at Capetown, South Africa. We believe that this is probably the most distant shipment of an Arizona product that has ever been made.

Our shipments in mining material, railroad material, and commercial lumber have increased considerably and the territory which we now reach has been very materially extended. It is unfortunate for us and, we believe, for the Territory that transportation facilities within Arizona are not such as to permit us to reach some of the largest consumers of lumber within the Territory. To certain parts of the Territory lumber is being brought from 1,000 to 2,500 miles at freight rates very much lower than can be shipped under by ourselves to the same points, a distance of only between 300 to 500 miles. It is to be regretted that the interests of the Territory are thus made to suffer and that the industries of States with which we have nothing in common are built up at the expense of our own.

The policy of the General Government in withdrawing from entry all forest lands within the Territory and forming them into forest reserves has greatly diminished the available timber resources of the Territory. It is to be expected that such rules as will make the mature timber on these reservations available will in time be formulated by the Government, but for the present they are absolutely withdrawn both from entry and from availability for commercial purposes. The policy of the Government in conserving the forest interests of the Territory is undoubtedly a wise one and will ultimately redound to the commercial benefit of all interests of the Territory, but for the present it leaves the interests of the Saginaw and Manistee Lumber Company at Williams and those belonging to this company, with a few minor holdings, practically the only timber resources in the Territory available for commercial uses.

The Arizona Lumber and Timber Company has been continuously in operation for twenty years, the whistle having blown for the first time on August 20, 1882. The volume of business has constantly increased until it is now from four to six times as great as during any one year of the first ten years of its existence. A better index of the general progress of the Territory, we believe, could not be had, for the advance in our operations has been the result of the advance made in the interests surrounding us.

Saginaw and Manistee Lumber Company, Williams.—Mr. William F. Dermont, general manager of the Saginaw and Manistee Lumber Company, has submitted a brief statement of the progress made by his company during the year, and the quantity of lumber, boxes, and other articles manufactured.

The manufacture of lumber for the fiscal year closed June 30, 1902, was 23,000,000 feet, and other production is given as follows: Box shooks, 5,400,000 feet; lath, 4,769,000; stulls, 64,765 linear feet.

The average number of men employed in the woods by the company during the year was 130; the average number employed in the sawmill, planing mill, box factory, and yard was 200.

The company operates the Saginaw Southern Railway, which runs into the forests from the mills, and during the year branches of this road were built to extend farther into the forests.

FOREST RESERVES.

A number of forest reserves have been made in Arizona during the past year, removing large areas of land from entry. The San Francisco Forest Reserve, created August 17, 1898, was enlarged by Executive order of April 12, 1902, so as to cover the sections owned by the Santa Fe Pacific Railroad Company, successors to the Atlantic-Pacific Railroad. The Black Mesa Forest Reserve was created August 17,

1898; the Prescott Forest Reserve was created May 10, 1898, and enlarged October 21, 1899; the Santa Rita Forest Reserve was created by Executive order of April 11, 1902, and is situated south and southeast of Tucson; the Santa Catalina Forest Reserve, created by Executive order July 2, 1902, is situated northeast of Tucson; Mount Graham Forest Reserve, created by Executive order dated July 22, 1902, is situated northeast and south of Camp Grant Military Reservation; Chiricahua Forest Reservation, created by Executive order of July 30, 1902, is situated east of Tombstone, in Cochise County, and extends about 10 to 15 miles from the New Mexico boundary; Grand Canyon Forest Reserve was created by Executive order of February 20, 1893.

Four sections of land southeast of Tucson, in Pima County, were reserved during the year for an agricultural experimental station, and the director of the agricultural experimental station of Arizona has under way, upon this land, experimentations in the improvement of the ranges.

Tree planting.—An inspection of the mountains and hills in the neighborhood of Prescott and other portions of the Territory, which have in the past been denuded of their timber, leads to the belief that the Government Forestry Department should plant either young trees or seeds of forest trees common to their several localities. Massive stumps of the oak, pines in variety, ash, walnut, sycamore, juniper, birch, cottonwood, and other trees indicate that the soil is capable of growing large timber, and if the Forestry Department should instruct the forest supervisors to collect and plant seeds of trees in suitable places, in time these districts would again be growing timber of the greatest value to the country; and with the growth of timber it may be expected that the present unfavorable conditions of the climate will be affected, for the trees will attract and conserve moisture. It may be safely predicted that the old springs will revive and the dry water courses again be charged with running water for the use of the miner in reducing his ores and the irrigator in cultivating the valleys below.

Another matter for the consideration of the Forestry Department is the necessity of replanting young trees upon the ground which is now being laid bare by lumbermen. Lumber in the future will be in great demand, and provision for its growth is of the greatest importance to the country. Nature in its wild way cares for many young trees on the mountain sides, but its efforts can be increased a thousandfold by the guiding hand of the Forestry Department.

MINING.

Guiding and directing the destiny of every industry, mining in Arizona has always occupied the vanguard of civilization; progress and wealth in all commercial lines, education, society, and the advancement of cities and towns all received their impetus of growth because of the development of some rich mining district, which made it possible for other industries to thrive. But few counties in Arizona present exceptions to this fact; yet if the history of the settlement of the country is closely studied it will be found that scarcely a community in Arizona has not sprung up more or less directly through the influence of mining development; therefore it must be conceded that mining stands first and foremost, planting the outpost of civilization in new districts, creating wholesome conditions of life in untamed and

uninhabited mountains, and adding each year to the taxable wealth of the Territory and its individual prosperity.

The knowledge that vast mineral wealth was hidden in the mountains of Arizona made hundreds of brave men risk the dangers of the early frontier. The Ajo copper mines in Yuma County were among the first discovered; the Vulture, in Maricopa, began to give up its great wealth a few years later, and long before these mines were found by European settlers the Indians and Spaniards had worked and recovered untold wealth from mineral veins in this Territory. The cattle industry came after mining had led the way and made a path in the wilderness for the greater civilization which was to follow. Other industries appeared, drawn by the magnetism of treasure stored in mountains and plains, until to-day we find Arizona one of the greatest commonwealths in the United States, and mining occupies the vanguard, as it has from the start, in the march of progress toward the greatest realization of development in all of the Territory's resources.

There is scarcely a mountain range in Arizona of any importance that is not highly mineralized. Mining camps are now found from one end of the Territory to the other, and new districts are being developed and mines opened up with astonishing rapidity. So great is this development in Arizona at the present time that one soon loses track of the growth unless constant attention is applied. Where there was a prospector's camp a year ago, to-day there exists a prosperous production camp, with extensive equipment and populated by mining operators and miners.

The production of gold in Arizona increases each year as development of this metal progresses. Arizona contains within its borders some of the richest gold-producing camps in the United States.

The production of copper has made this Territory famous throughout the world as a mining region. The chief copper-producing mines are the United Verde at Jerome, the Copper Queen at Bisbee, the Old Dominion and the United Globe mines at Globe, the Arizona Copper Company's mines at Clifton, the Detroit Copper Company's mines at Morenci, the Shannon copper mines near Clifton, the Silver Bell in Pima County, the Troy mines in Pinal County, and a number of other camps.

The decrease in the prices obtained for copper has resulted in the closing down of Helvetia, Silver Bell, and a number of other smaller camps during the year; but the large mines have not been materially affected.

Every mining district of Arizona reports activity in the development of properties during the year, and extensive sales of mines have been made, resulting in the investment of large sums of capital in development and equipment.

Scarcity of water in many of the mining districts has retarded development to some extent; but this drawback is frequently met with in Arizona, and miners are usually prepared to overcome the adverse conditions.

Important additions have been made to the mining operations within the Territory. Several large mines have become producers, bringing into existence new and important mining camps, and the progress of the year was perhaps the most extensive in the history of mining in Arizona.

Yavapai, Graham, Cochise, Gila, Yuma, Pima, Pinal, and Mohave

are the leading mining counties of Arizona. Maricopa County has a number of rich mines, embracing within its boundaries the famous Vulture gold mine, which in years past was one of the great wealth producers of the Southwest. The Phoenix gold mine is in this county, and there are a great many excellent mining properties in the Castle Creek district which have received attention during the year in development and equipment. Maricopa County does not claim to possess the biggest mines, but the county stands always ready to provide hay and grain, vegetables, fruits, and other products of the ranches to all the great mines within reach.

In order to present substantial information in regard to the advancement in the mining industry during the past fiscal year, I have the honor to submit herewith brief descriptions of some of the leading mines of Arizona of which reports have been submitted to me:

COCHISE COUNTY.

Cochise County has advanced wonderfully during the year in mining. A number of productive mines have been opened up in different sections of the county, and the expansion of Bisbee, the great copper camp, has been most marked.

Douglas, the new town on the international border, is to be a center of smelting and reduction works, aside from the claims it possesses as a railroad point of importance. The Copper Queen Consolidated Mining Company will construct large reduction works at this place, which will embrace processes for the treatment of all products of the mines of Phelps, Dodge & Co. in Arizona and northern Sonora. The works will have a capacity of 1,500 tons per day. The Calumet and Arizona Mining Company is also constructing reduction works at Douglas, where the ores from the company's mines in the Bisbee district will receive treatment. The plant will have a capacity of 600 tons per day.

The Copper Queen Consolidated Mining Company is building a store at Douglas, which will cost $100,000 when completed. From this store supplies will be furnished the different smelting and mining camps of the company, including Douglas, Nacosari, and other camps.

Calumet and Arizona mines.—The Calumet and Arizona Mining Company, a new corporation in Arizona, has organized three companies during the past year to operate in mining enterprises. I. L. Merrill, superintendent of the Calumet and Arizona Mining Company, reports that his company has completed 4 miles of exploration work underground during the year. This work has exposed ore bodies of fair average in copper, gold, and silver. The smelter, of 600 tons capacity, which is being erected at Douglas, will be in operation by October 1 of the present year. This company has expended for exploration work and machinery during the past year $400,000. This sum does not include the purchase price of the properties, which is said to be $500,000.

Copper Queen Consolidated Mining Company.—Mr. Walter Douglas, superintendent of this company, reports as follows on the progress of the company's operations during the past year:

The output of this company for the twelve months ending June 30, 1902, was 18,313 tons of copper. The mine is operated and the ore is brought to the surface through five shafts, of which two are used for development work only. The different shafts are connected with the smelting works by a standard-gauge railroad, and

the ore is transported by this railroad from the storage bins at the hoisting works to the main smelter bins from whence the furnaces are fed. The reduction works are composed of a smelting and converting plant, there being five steel water-jacketed furnaces 120 by 42 inches and five 5 by 9 foot "Queen Type" converters. Steam is furnished for the hoisting and reduction works by 32 common tubular and marine boilers of various sizes and designs, the fuel at present in use being crude oil from Texas and California. The total consumption is about 13,000 gallons per day, while about 100 tons of coke is consumed at the smelter.

The wage of underground work is a uniform one of $3.50, all working eight-hour shifts. This also applies to a great extent in the smelting works as regards skilled labor.

On account of the congested condition of the reduction works, it has been decided to remove the smelting operations to a more convenient locality, and there is being constructed at the present time a new and modern plant at Douglas, 28 miles from the mines, which will have a capacity of 1,500 tons of crude ore per day.

The Black Diamond.—A new camp has appeared in the Dragoon Range of mountains known as Black Diamond. It is 7 miles from Pearce, and has grown during the year to be a camp of several hundred people. A smelter of 200 tons' capacity has been erected upon this property, and will soon be in operation. Over one hundred men are constantly employed in the Black Diamond mines. The product of the mines is copper.

Tombstone Consolidated Mines.—Mr. H. J. Gray, assistant superintendent of this company, has provided the following information concerning the mines and operations of his company at Tombstone during the past year:

During the past year active work has been resumed in Tombstone mining district. A new company, the Tombstone Consolidated Mines Company, Limited, has secured nearly all the valuable claims in the district and is engaged in reopening the mines in preparation for working them below the water level, which proved a bar to further progress in their early history. An entirely new vertical shaft for drainage and hoisting has been sunk, reaching the water at 569 feet from the surface. The shaft has four compartments, two for rock and two for pumps and measures, 7 by 22 feet inside timbers, which are of the best quality of 10 by 10 inch Oregon pine, and will be 12 by 12 inches below the water. Two hoisting engines are installed, having cylinders 16 by 24 inches and 16 by 60 inches, the latter a double-reel first-motion flat-rope rock hoist and the former a geared hoist to handle the pumps. Steel buildings and a steel gallows frame have been erected to guard against the danger of fires, which have been so disastrous in the past. The boiler plant consists of four 200-horsepower internal-furnace boilers made for 125 pounds working pressure. The station pumps are of the duplex triple-expansion condensing type; two with cylinders 15, 23, and 39 inches; and 13 plungers with 24-inch stroke, and two with same sizes of steam cylinders and stroke, but 9¼-inch plungers. One of the above pumps goes at the 600-foot level and two at the 1,000-foot level when reached. The sinking pumps are simple direct-acting duplex pumps with steam cylinders 14 by 12 inches and 8-inch plungers. There are five of these, three to be in constant use, while the fourth is lowering and the fifth held in reserve for emergencies. The installation of the pumps is proceeding rapidly and sinking below water will begin as soon as the machinery is in place.

A railroad is being built to Tombstone from Fairbank by the El Paso and Southwestern Railroad Company, and will probably be completed by January 1.

The Tombstone company has had the mines examined and reported on by some of the best-known mining engineers of the country, who are unanimous in their opinions of their great value. The production of the mines when previously worked amounted to over $30,000,000 in gold, silver, and lead.

Commonwealth mine.—This gold-producing mine is regarded as one of the most substantial in Arizona. During the past year the work has been directed mainly in mining and developing ore bodies in the main workings. The mine is about 500 feet in depth, and pumping plants have been installed for deeper sinking. The drifts and stopes of the workings have been considerably extended, but little work has been done on the property of the company outside the main workings.

The Commonwealth is located at Pearce, on the eastern slope of the Dragoon range of mountains. A new stamp mill was erected recently to take the place of the one destroyed by fire. There are 80 stamps,

and about 200 tons of ore are crushed each day. Crude petroleum is used as fuel. About 200 men are employed throughout the year.

The Bisbee West, Copper Belle, South Bisbee, Arizona and Lowell, Gleason, Turquoise, and Dos Cabezas are among the important mines of the county which have received attention during the year, reports upon the development of which have not been received by me.

GILA COUNTY.

The United Globe mines.—Mr. N. S. Berray, superintendent of the United Globe mines, submits the following statement of the operations and progress made during the past fiscal year:

Our output is divided into two classes, one of which is ore produced under the supervision and direction of the company, and the other class is the result of the leasing to sundry miners the right of extracting ore from some of our outside claims, which ore could not be mined conveniently under the company's direction.

Of the first class, the amount of ore produced was 7,656,000 pounds, which averaged about 14 per cent, yielding approximately 1,000,000 pounds of copper at the furnaces. Owing to our smelter having been dismantled about two years ago, this ore was not treated here in Globe, but sent to the Phelps-Dodge smelters in Bisbee.

Of the second class, the lessees produced 1,140,000 pounds of ore assaying about 20 per cent, which yielded approximately 228,000 pounds of copper, this ore containing also a varying amount of silver, running from 1 to 15 ounces per ton, which added slightly to the value thereof. All of the lessees' ore was shipped to the custom smelters at El Paso, Tex., and to Silver City, N. Mex. It should be stated that the above figures for the output of lessees' ore represent the amount of ore shipped from July 1 to December 31, 1901. After that date all shipments from this source were stopped for the reason that the fall in the price of copper and a coincident rise in the smelting charges by the custom smelters effectually cut off all profit from these operations. Since January 1, 1902, the lessees, in the hope of a betterment of these conditions, have continued their mining operations, and not being able to ship, their ore has accumulated on our dumps until at the present time we have ready to ship at the first opportunity some 500 tons of high-grade, hand-sorted copper ore, which will average over 20 per cent copper and some silver.

It is to be noted that there is a considerable variance in the amount we produced last year and the production for this year, which is owing to the fact that our main shaft, on account of its unsafe condition, was abandoned, and the sinking of our new three-compartment shaft (commenced about March 1, 1901) being of primary importance, all other mining operations, such as production of ore, had to give way to it and were therefore curtailed to a certain extent.

On July 1, 1901, the new shaft had been sunk to a depth of about 400 feet. From that point the progress was considerably slower, and by April 1, 1902, the shaft had reached a depth of 765 feet. At this point a heavy flow of water broke into the shaft, flooding it to within a few feet of the third level, and since that time all of our energy has been directed toward unwatering the shaft with both boilers and pumps. From a flow of about 1,000,000 gallons per day the flow has decreased to about 250,000 gallons per day, and while we are as yet unable to prosecute the sinking to any extent, we are in condition to do a considerable amount of development work, which we are pushing on the fifth and seventh levels. By means of tunnels and drifts we have accomplished about 5,000 feet of development work in other portions of our property.

Our hoisting machine is a horsepower-geared double-drum hoist, and our pumping machinery consists of a compound condensing Knowles station pump and three Cameron sinkers. For these engines we have a boiler capacity of about 300 horsepower.

In July, 1901, the number of men we employed was 110. Owing to the concentration of our work in the shaft and the subsequent flooding thereof, we have reduced the force considerably and we now employ about fifty men, whose wages vary from $3 per day for surface labor to $4 per day for shaft men.

NOTE.—The condition in which our lessees find themselves is practically the condition of all the small producers of the district, who under better circumstances produced an average of 50 tons of similar ore each day.

Old Dominion Copper Mining and Smelting Company.—This prop-

erty is situated at Globe, Gila County. It is reached by the Gila Valley, Globe and Northern Railroad, which connects with the Southern Pacific Railroad at Teviston.

Since April 2, 1902, the company has purchased and is now installing a briquetting plant, two additional boilers, and a slag-reverberatory furnace. The cost of these additions to the plant and the cost of providing modern equipment and sinking a new shaft will involve an expenditure in the aggregate from $250,000 to $300,000.

The directors believe, however, that the whole amount required for this purpose, as well as paying the remaining floating indebtedness, can be obtained partly from the working of the flue dust and Continental ores now on hand and partly from the sale of matte and high-grade sulphide ores on hand at the mines, so that the company need not be burdened either by a floating indebtedness or bond issue, and that the issue of additional stock is not required.

The production of fine copper for the year ending December 31, 1901, was 10,094,787 pounds, and has been continued at the same rate.

For the year ending December 31, 1901, the total cost of producing the fine copper laid down in New York and sold as electrolytic copper was 12½ cents per pound, as reported to the stockholders by the old management.

For the three months ending June 30, 1902, the cost of production of fine copper, laid down in New York and sold in the form of pig copper, has been 10½ cents. (The cost of refining pig copper into electrolytic copper is about three-fourths of a cent per pound.)

GRAHAM COUNTY.

The Arizona Copper Company.—The mines and works of this company are located at Clifton, in Graham County, and are among the most extensive in Arizona. Mr. Alex. Veitch, assistant manager of this company, has submitted a statement of the progress made during the year ending June 3, 1902, which is presented below:

Mining was carried on upon the same lines as formerly. The bulk of the ore mined came from stopes and open cuts. A great amount of drifting, cross-cutting, and sinking was also done, but mostly for the purpose of development.

The ore is conveyed from the mines to the Coronado Railway over gravity inclines and dumped into bins and transferred to the Coronado Railway cars for transportation to the bins at the works at Clifton.

The Coronado Railway from Clifton to Longfellow, a distance of 4 miles, was changed from 20-inch to 60-inch gauge; from Longfellow to Metcalf, 2½ miles, the gauge is 20 inches, but is at present being changed to 36-inch gauge.

During the month of August last year the smelting plant at Clifton was entirely remodeled. The old plant, composed of 7 water-jacket furnaces of a daily capacity of 80 tons each, was replaced by a new plant, which has 5 furnaces of 350 tons daily capacity each. A new blower building was erected, which contains three No. 9 and one No. 7 Root's blowers. These blowers are operated by a 270-horsepower Corliss engine.

A 300-ton concentrator was built at the Longfellow mines, and this, with the four concentrating plants already in operation at Clifton, gives a daily concentrating capacity of 1,100 tons. The concentrator at Longfellow is operated by three 110-horsepower gas engines of the Crossley type. Two of the concentrators at Clifton are operated by electric power and two by gas-engine power.

The power plant is composed of six 100-horsepower Crossley engines belted to six 100-horsepower dynamos, five 50-horsepower gas engines which drive a Reidler air compressor which supplies blast for the converter plant, and two 25-horsepower gas engines belted to dynamos for electric light. The convertor plant has three stands in operation with a daily capacity of 50 tons Bessemer copper. The leaching

plant has a daily capacity of 250 tons. The acid plant, which supplies sulphuric acid for leaching, has a daily capacity of 13 tons H_2SO_4.

The total amount of copper produced during the year ending June 30, 1902, was as follows: Bessemer copper, 13,405 tons; bluestone copper, 557 tons.

Consolidated Gold Mountain mines.—A new mining district came into prominence early in the past year, and the marvelous gold discovery, which gave the district the undivided attention of mining men for some time, was remarkable in many respects. Located in the Galiuro Mountains of Graham County, a region heretofore seldom visited, the big gold vein, which is now the property of this company, was entirely overlooked, and might have remained in the wilderness for many years had it not been for a tireless prospector, Jack Garden, who found the vein early in the year. The company has spent during the year about $20,000 in development work. It is the purpose of the company to continue the development of the property, and later erect reduction works.

Mr. Porter W. Flemming, secretary of the Consolidated Gold Mountain Mining Company, submits the following report of his company's operations during the year in the new district:

Besides the original company claims the company held under bond eleven claims bonded to the company in the total sum of $160,000. The company has taken up the bonds and now has title in fee simple to about twenty-five claims, two mill sites and two power sites on Arivaipai Creek. The power sites have sufficient water to develop 1,000 to 2,000 horsepower, according to tests by an engineer. Professor Blake, of the Arizona School of Mines, made a very elaborate report of the Galiuro formation, and gave it as his opinion that the gold values would increase in value with depth. The company is now preparing to gain greater depth, and the present shaft already shows that the best values will be obtained at water level.

This is distinctly a gold property, and the ledge forms a very prominent outcrop above the level of the surrounding country.

Detroit Copper Company.—The mines of this company are located at Morenci, a few miles from Clifton. The camp has a population of 4,000 people, and has grown up under extensive operations carried on for many years by the Detroit Copper Company, which is controlled by Phelps-Dodge & Co. and Mr. James Douglas, who own the Copper Queen at Bisbee. The Detroit copper camp ranks fourth among the large producing mines of Arizona. The company operates its mines and works upon an extensive scale under the direction of Mr. C. E. Mills.

The production of copper is between 1,300,000 and 1,400,000 pounds per month. During the past year the camp has progressed wonderfully.

Shannon mines.—One of the most important of the new copper mines of Arizona is the Shannon, near Clifton, where the Shannon Copper Mining Company is operating. A recent report of the progress of this company says:

A surface tram line, which is built on an incline of 36°, 1,500 feet long, and double-tracked, is operating between the bottom of the Chase Gulch and the main tunnel of the mines. At the foot of this incline are six ore bins with chutes for loading into cars. At the upper terminus are six similar bins which receive the various grades of ore from the mine. The cars on the incline operate by gravity, the 1⅛-inch cable winding on a double drum reel at the upper terminus. These drums are 13 feet in diameter, each 5 feet 8 inches wide, and having a 14-inch brake band. This gravity-operated hoist runs an air compressor, the latter serving as an auxiliary brake, so as to absolutely control the motion of the loads on the line. The main double track line cross-cuts to the ore bodies in Shannon Hill. It is 715 feet long and cuts about 300 feet below the apex. It is 7 by 8 feet and was driven in seventy-eight days by hand drilling at a cost of $5 per foot. This tunnel connects with numerous other

tunnels, drifts, and levels from different directions, and also with workings above it through chutes.

The principal mine of the company is located about 8 miles northwest of Clifton, a half mile from Metcalf, and at a considerable elevation in a mountain range. The main mine opening is a double track tunnel in Shannon Hill, above Chase Gulch. This tunnel, 715 feet long, cross-cuts the ore bodies at a depth of 300 feet below the apex. This tunnel connects with various other drifts and tunnels and workings above them, by which the mine has already been developed.

The company has built a spur railway track from the Arizona and New Mexico Railway to the smelter. The smelter consists essentially of two blast furnaces with a daily capacity of 600 tons.

The first product is black copper, but it is planned to soon put in concentrators and a bessemerizing plant. The company has in use one 28-horsepower engine, one 34-horsepower engine, one 6-horsepower engine and pump combined, all consuming gasoline. The smelting plant of the Shannon Copper Company is located about a mile from Clifton and near San Francisco River. The furnaces are built in a steel structure, 42 by 80 feet in size.

MOHAVE COUNTY.

In the Chloride district a 50-ton vulcan smelter has been completed at Chloride by the Shasta County Smelting and Refining Company, the operation of which started auspiciously. The company proposes to erect an additional 100-ton stack during the present year.

One complete 200-ton concentrating mill has been completed at Chloride during the year, and the district is in excellent condition.

Mohave County, in the northwestern corner of the Territory, is one of the important mining counties of Arizona and the one that depends the most exclusively on the mining industry. On its west are California and Nevada, and on its north Nevada and Utah. The Colorado River bounds it on the west. It has 112,000 square miles, but a very small population. Very little of its arid valleys and plains are yet irrigated, but the country has thousands of acres that could be reclaimed. Three mountain ranges traverse the county from north to south, and their rocky ribs are seamed with ledges of gold, silver, copper, and lead. Near Mineral Park are many ledges of turquoise, which show evidences of having been systematically worked by a prehistoric race. Stone hammers and rude tools have been found in all the openings of the mines. There are immense beds of gypsum along the Colorado River northwest of Kingman.

Mohave County's mines are estimated to have yielded over $40,000,000 in thirty years. Mining began in 1860, but did not flourish until the coming of the Santa Fe Pacific Railroad across the country. Before that communication with the outside world was by way of steamer down the Colorado River. Some very valuable discoveries were made in the White Hill district in 1892, since which time large amounts of Eastern capital have been invested and development has been rapid. In one case an English company paid $1,750,000 for the White Hill group, and have since expended $500,000 in developing water and working the mine. At Chloride a 100-ton concentrating plant is being worked by a Scotch syndicate on the ore from the Elkhart mine, and a 40-ton stamp mill is working in the White Hills.

The Hualapai mining district contains an area of 15 miles in length by 3 miles in width and is composed of five different mining camps—Chloride, Mineral Park, Todd Basin, Cerbat, and Stockton Hill.

A few miles south of Kingman a district rich in gold is being opened up, and several small mills will soon be erected to work the ores. The

dry placer mines of the Chemehuevis Mountains continue to add thousands of dollars annually to the wealth of the world. In Todd Basin, 16 miles north of Kingman, is the Oro Plata mine.

PIMA COUNTY.

Silver Bell mining district.—This district is located in the Silver Bell Mountains, 26 miles southwest from Redrock, a station on the Southern Pacific Railroad, 45 miles west of the city of Tucson.

The following companies own the mines of the district: Silver Bell Copper Company, Atlas and Redrock Mining Company, and Oxide Copper Company.

The Oxide Copper Company during the past year sank a 500-foot perpendicular shaft, and are now drifting for the ore body. The mine is equipped with a gasoline hoist and an air compressor to operate machine drills. The mine produces about 34,000 gallons of water per twenty-four hours. There are also some springs near the mine.

The Atlas and Redrock Company's property is not worked. The Silver Bell Copper Company have developed to a depth of 400 feet on the ore body with drifts and levels at 100, 150, 250, and 350 feet. The drifts run north and south several hundred feet on the above levels. Crosscuts have been run from east to west 50 to 120 feet on the ore at the several levels, the ore at the lowest workings carrying values as high as at any point above. The surface ores are carbonates of copper, and with depth they turn to sulphides (chalcopyrite).

From 9,000 to 10,000 feet of work was done within the last year, and from this work over 16,000 tons of ore were extracted (no stoping being allowed).

The furnaces smelted 16,442 tons of ore, producing 4,487,076 pounds matte, which, when refined, produced 2,650,000 pounds copper. The ore averaged 8 per cent copper and 2 to 3 ounces silver.

Total smelting cost	$101,313.75
Total mining cost	74,569.73
Total cost	175,883.48
Net value of matte in New York	280,396.39
Profit on three hundred and eight days' run of furnace	104,512.91

Although an old district, nothing but surface work has been done until the last year. The Silver Bell Copper Company having acquired title at that time, at once commenced to develop their property. They have now, besides the deeper workings referred to, developed the surface showing of 4,500 feet in length and 100 to 200 feet wide. It is the intention now to equip the property with reduction works suitable for such a property and connect same by rail with the Southern Pacific Railroad. The property is equipped at present with a 30-horsepower steam hoisting works; 25-horsepower gasoline air compressor to operate machine drills; two 50-ton furnaces (circular water-jacket type), complete with two 60-horsepower boilers, engines, blowers, etc.

The fuel for hoist and furnace is wood, purchased at $3 per cord. Water sufficient for present purposes is secured from wells of 30 to 70 feet deep. This will be increased to the limit of consumption from the lower workings of the mine, which are now at the water level.

The fissured zone of the Silver Bell Mountain is located at the west-

ern base of the range and at quite a distance below the contact of the overlaying sedimentaries. The ore is associated with various trappean dikes, consisting of basalt and dolorite. However, a great deal of the ore obtained is in the shattered zones in the great fissures, unaccompanied by dikes, the evidence of fumarolic action being very great, as is exhibited in the large deposits of the secondary deposition of lime carbonate (calcite); also by the large deposition of manganese.

This district has every evidence of becoming one of the great producers of this section of Arizona.

Catalina Copper Mining Company.—The properties of this company are located in the Santa Catalina Mountains, about 25 miles in a direct line from Tucson, northeasterly, and about 12 miles from the San Pedro River, and covers over a mile in length of a large copper belt. The ore occurs in a contact vein between lime and quartzite. The croppings on this vein extend the full length of the property. These croppings have been opened up by shafts for the entire length of the vein on the property.

The principal development has been done on the Silver Reef claim, under the large outcrop. A crosscut tunnel was run 320 feet in length, crosscutting a vein of sulphide ore 15 feet in width 250 feet beneath the surface outcrop. A drift 260 feet has been run on this ore. A raise was run from this drift to the surface, following the ore. A winze is now being sunk in the drift, following the ore down, and is now down 60 feet. Over 2,000 feet of development has been done on the property, and work is being pushed as rapidly as possible. The company owns water rights sufficient for reduction works and also for generating electric power for running machinery.

This mine will be within 10 or 12 miles of the proposed Phoenix and Eastern Railroad, which will give cheap transportation. The improvements consist of cars and track in the mine and good stone and frame buildings for the camp.

Old Baldy district.—In the Santa Rita Range of mountains the Old Baldy mining district is fast being developed. For the past six years active work has been carried on by numerous mining men who own promising claims in that range of mountains. The Old Baldy mines, embracing about twenty claims, have during the past year received a great deal of attention. W. B. McCleary, the principal owner of these mines, reports that the development of copper, gold, lead, silver, and molybdenite has been prosecuted successfully, and the district is one of great promise.

Santa Rita Mountains.—The New York Mining Company is developing mines in this range with success, and the Narragansett mine, a copper property, has produced considerable shipping ore. The Cuprite is a new camp in this range, the mines having been developed during the year to some considerable extent, and equipment placed upon the property. Helvetia, which two years ago was a progressive camp, is at present closed, owing to the decrease in the price of copper. This camp is equipped with a smelter, a baby-gauge railway for the transportation of the ores from the mines to the works, and is prepared to carry on the mining and production of copper extensively. Throughout the Santa Rita Range there are a great many promising mining properties, some of which have been developed during the year, and many of them providing shipping ore.

SANTA CRUZ COUNTY.

Mowry mines.—Mr. J. N. Curtis, general manager of the Mowry mines, has submitted the following interesting report of these historic mining properties:

The Mowry is one of the oldest mines in this section of Arizona, and the most historical, having been confiscated by the United States Government during the civil war on account of the owner, Lieutenant Mowry, furnishing lead to the Confederate Army. These mines are located in the Patagonia Mountains, 14 miles southerly from the town of Patagonia, a station on the New Mexico and Arizona Railway.

The Mowry vein is located on the contact between the Cambrian quartzite and the Silurian lime. The ore itself is an altered product from the Cambrian quartzite; its values are lead-silver, occurring as a cerussite (carbonate of lead).

The action of ascensive hot waters in this mine is very evident and conclusive. The different water courses, carrying large amounts of manganese and calcite, are plainly discernible along the strike of the vein. The uptilted sedimentaries on the outcrop of the vein are almost vertical, but as the vein continues on its downward course it follows the dip of the sedimentaries so far, and stands now at a depth of 300 feet, approximately at 55 degrees from the horizontal. The granite to the south of the Cambrian quartzite is very prominent, but altered to a considerable extent.

The ore chutes, several in number, cross the strike of the vein from west to east at an angle of about 45 degrees, showing great strength and continuity. The mineralization of this vein is undoubtedly the result of volcanic explosions in its immediate vicinity, which were subsequently followed by wonderful geyser action.

Upon the property several shafts have been sunk. The deepest now down is 340 feet (the water level), and several hundreds of feet of drifts, crosscuts, etc., have been run, fully 3,000 feet of work being done. The main shaft will be sunk at least another 100 feet to prove the ore value below the water level.

The mine now produces 40,000 gallons of water per day. This is sufficient for all present requirements. The property is equipped with two steam hoisting works and a 50-ton concentrating mill.

The nearest mines to this property now being worked are the Pride of the West and others, of Washington Camp, some 5 miles to the south. Washington is a very important mining camp of Arizona on account of the treatment they have so successfully adopted on a very base ore.

Other mines.—In this county there are many important mines, notably the Pride of the West, the World's Fair, the Patagonia district, and other mining centers. Reports have not been received from these different camps, hence I am unable to give a comprehensive report of the development which has been carried on during the year.

Many new mines are now being worked in Santa Cruz County, great activity being reported in the Santa Rita Mountains. This range of mountains runs northwest and southeast and is richly mineralized. A portion of the mining districts of this range are in Santa Cruz County and some are in Pima County, notably Old Baldy, Helvetia, and a number of other districts.

YUMA COUNTY.

General development.—The greatest industrial advancement of Yuma County during the past year has been in mining. Two of the largest gold producers of the Territory—the King of Arizona and La Fortuna—are located in this county. Millions of dollars have been produced by La Fortuna during the past six years, and the King of Arizona has entered upon a profitable career of production, which is fast placing it in the front rank of gold mines of the Southwest.

At Quartzite, in the northern portion of Yuma County, the development of mining claims is carried on actively, and successful results have been attained. Fifteen companies are now at work upon mines

in that district. The Guadalupe Mining and Milling Company operate a stamp mill at Wells, the supply camp of the new district.

The Harqua Hala mines, rich in gold production for many years, have again been operated during the year. Between Harrisburg and Harqua Hala the properties of the Rio Del Monte Company, twenty or more claims in number, are being extensively developed. The erection of a 40-stamp mill upon this property will begin during the fall months.

At Harrisburg the Socorro Gold Company is actively engaged in developing their mining properties. The Desert Dwarf is a new gold producer of Yuma County. It has been developed to a depth of 500 feet.

The Castle Dome lead mines in Yuma County are among the richest and most productive in the Territory. Since 1863 these mines have been worked almost constantly, first by the Indians and later by Americans. To-day these mines are producing quantities of lead and silver ore, and a large number of men are employed.

Among other prominent gold districts of Yuma County are Centennial, Paloma, Picacho, Pot Holes, and numerous placer mining districts along the course of the Colorado River.

Yuma County is essentially a gold-producing region, although there are some copper, silver, and lead mines there.

YAVAPAI COUNTY.

Congress Consolidated mines.—These mines are famous as deep gold workings, and are perhaps the deepest mines in this section of the United States. The statement of Mr. W. F. Staunton, superintendent of the mines, appears below:

Production for the year ending June 30, 1902.

[In fine ounces.]

	Gold.	Silver.
From concentrates shipped to—		
Pueblo	16,647	16,052
El Paso	4,892	8,603
Total	21,539	24,655
From cyanide bullion shipped to mint	13,960	10,327
Total production	35,499	34,982

All the mines of the company have been actively and continuously worked during the year, the average number of men employed being 350. Miners' wages are $3 for hand work and $3.50 for machine. The amount of ore mined and milled was 50,947 tons of 2,000 pounds. There are five principal shafts, having depths as follows: 1,150, 1,700, 3,125, 700, and 1,200 feet. The amount of development work done during the year was about 10,000 linear feet, consisting mostly of drifts on the veins.

A new 40-stamp mill was started on May 22, 1901, and has since run continuously. It has 1,000-pound stamps, dropping 6 inches 100 times per minute. Twenty mesh No. 24 steel-wire screens are used, and new standard concentrating tables. The mortars have 7-ton cast iron anvil blocks under each, which rest on concrete. The mill engine is compound condensing, as is also the air compressor, which is placed in the mill engine room and furnishes compressed air at 100 pounds pressure throughout the mine for drilling and other power uses. Twenty 2¼-inch Sullivan drills are used. Crude oil is used for fuel. The works are lighted by electricity. The mill tailings are treated by cyanide process, after a preliminary roasting in a Brown mechanical furnace fired with crude oil.

Octave gold mines.—A new gold camp of great importance, known as the Octave, has sprung into existence in Yavapai County, 10 miles in a northeasterly direction from the Congress mine, in the foothills of the famous Rich Hill. A description of the development of the mines and the equipment of them is given below by Mr. A. E. Hurley, assistant superintendent of the Octave Gold Mining Company:

Our ledge runs in a northeast and southeast direction and dips about 26° from the horizontal; is worked by three tunnels, the lower of which taps the vein at about 600 feet in depth. We have five shafts, two of which are used as main working shafts, one being 1,010 feet, the other 1,028 feet in depth. The ledge at these depths is considerable larger than in the surface workings.

During the year ending June 30 we have mined and treated about 50,000 tons of ore. Our method is wet crushing in a 40-stamp mill, amalgamation and concentration by 12 frue vanners and cyaniding the wet pulp direct from the vanners without either drying or roasting.

Our method of treatment is very economical, inasmuch as the ore is handled automatically from the time it enters the rock breaker until the tailings are sluiced from the leaching mats.

We have, during the past year, completed about 10,000 feet of development work, all of which has been confined to this property, as we have done no exploration work in this district aside from the Octave.

The company, however, is working quite extensively in the Prescott district, operating the Penn mine commonly known as the "Mudhole," also the Crooks mine.

Oro Grande.—The Oro Grande mine has made its greatest development during the past year. From a mere prospect it has grown into a property of considerable importance. The report of the progress made during the year, furnished me by the manager of the Oro Grande Mines Company, is submitted herewith:

The property is located 4½ miles in a northerly direction from the town of Wickenburg, and consists of nine claims situated in the Black Rock mining district, Yavapai County, and three mill sites on the Hassayampa River, on which there is a running stream of water, which during the dryest seasons has never been known to carry less than 400 miner's inches. All of these claims and mill sites have been surveyed, and final application has been made to the Government for patent.

The strike on the main vein, on which we own 7,500 feet, or five claims lengths, is a little to the east of the north, and it can be plainly traced on the surface for a distance of over 4,000 feet. Following it north from the present working shaft, which is situated on the Copperhead claim, as the higher slopes of the hill above are reached the vein is talus capped and covered in places, but in every instance where this capping has been removed the ore body is exposed beneath it and shows up the character strongly. At some points the vein crops out boldly and shows a width of over 100 feet. Lower down the hill, where the surface water has cut gulches in deeply, large croppings of the ledge matter is exposed which is identical with the material of the ore body as developed in the underground workings. On the Frenchman claim, which is about 1,600 feet north of the present working shaft and on the same vein, an adit has been run into the hill a distance of 25 feet and winze sunk 18 feet. This work is in ore and demonstrates that the vein is strong and continuous to that point.

On the side claims there are numerous small veins running at angles to the main lode, notably on the Collosal Claim, which bears a ledge very similar to the main vein. On this a shaft has been sunk to 20 feet and exposes the vein to that depth, and it can be traced on the surface for fully 1,500 feet. Also on the Nigger Ben and Mountain Claims are ledges exposed, but possessory work only being done on them, nothing definite as to their value or extent can be stated.

The main ore body lies between a micaceous schist on the west and diorite and feldspathic granite on the east. It consists of a friable porphyry quartz, with numberless pockets of black and brown ferruginous oxides. The highest gold values are found in these oxide pockets.

Development work on the Oro Grande mine was commenced early in the year 1901. Since that time we have done 535 feet of sinking and raising, and 2,437 feet of drifting and crosscutting, all of the workings being large. All of the crosscuts, which we have run from wall to wall, show the average width of the ore body to be 120 feet.

At a point about 1,000 feet from the present working shaft we are now sinking a three-compartment shaft which will be used as a working shaft when completed. With this we will connect the different levels, which is the course of our work at present, and this will serve to develop the vein to that point, and from where further work will be carried on.

Jessie Mines Company.—This company has grown out of the Little Jessie mines, situated in Yavapai County, and was organized for the purpose of interesting capital in putting a 200-ton cyanide mill upon the Little Jessie mines. The development work consists of several shafts, ranging in depth from 50 feet to 657 feet each, with six levels on the main shaft with an average of 500 feet each. The lower grade ores, being free from copper, are adapted for the operation of cyanide successfully. The mines are not working at present, the Jessie Mines Company being engaged in securing capital for future operations.

Mineral development.—The past year has witnessed astonishing development in Yavapai County. In 1901 within its borders were 434 patented mines, valued, together with improvements, at $1,041,080.85. This year, 1902, shows 674 patented claims, which, together with improvements, are assessed for $1,810,069.41. This growth has not been confined to any one particular district but is scattered throughout the entire country. The first placer gold discovered in the Territory was found in Yapavai County, at Weaver and on Lynx Creek. These districts are still being worked and pay well at this late day, the ground in some places being worked over and over again with the dry washer process, while in other places water is being pumped for sluicing. With proper water storage one cannot state just what these rich beds will yield. The processes now employed pay fair wages to those who undertake the work.

In the past year quartz mining has seen its greatest activity in the history of the country. The principal mines now in operation and the ones that have made the greatest improvements in the past year are as follows:

At the United Verde, the greatest copper mine in the West, the capacity of the plant has been increased and the production of ore has been the largest in the history of the mine.

At Congress a new 40-stamp mill was erected and the plant further equipped for milling purposes.

Octave shows a large increase in the number of men employed and in the production of concentrates and gold bullion. At the Poland a tunnel running 8,500 feet is being driven for development of mineral veins and for traction. The Penn Gold Mining Company has increased the capacity of its plant. At Victor the development of ore has been pushed.

The Braganza Mining Company's mine is being systematically developed and is producing concentrates and bullion. The Catoctin mine is now being reopened.

The Oro Mining Company is building a new mill and opening the mine. The Iron Queen Company is building a smelter near Mayer and opening mines. The Yeager Canyon Copper Company have been pushing development work. The McCabe extension has sunk a new shaft and made other improvements.

The Model Gold Mining Company has been operating the McCabe mine and producing ore. At the South Poland development work is being pushed. At Crown Point bodies of ore have been developed. The Merchants' Mining Company is operating the First Home mine.

The Val Verde smelter has been in operation, and has proven a boon to ore shippers and an important factor in the development of the mining industry of Yavapai County.

Reports have not been received from a large number of mining districts in Yavapai County; hence I am unable to present further particulars of the development made during the year.

TERRITORIAL GEOLOGIST.

Prof. William P. Blake, Territorial geologist and director of the school of mines, University of Arizona, has submitted an interesting report, from which I have the honor to submit the following excerpts, which will show the progress made in the development of various minerals during the year.

Mining in Arizona during the year ending June 30, 1902, has been characterized by great activity and a large influx of Eastern capital for exploration and development. The output of the old established properties has been steadily maintained, and new discoveries give bright promises for the future.

The more noted gold mines, especially the Fortuna and the King of Arizona, in Yuma County, the Congress and other mines in Yavapai County, and the Commonwealth at Pearce, in Cochise County, have been steadily worked. The Crowned King, in Yavapai, has been closed, for a part of the time at least, by litigation. The Mammoth mine, in Pinal County, for a long time a large producer, has been worked down to the water level and is closed for the present, pending a reorganization of the company and a probable combination of the different properties preparatory to draining and deeper working.

A notable and important example of the need of consolidation of many adjacent mining claims for the purpose of deep mining below the general water level of the region is found in the Tombstone mining district, which was a large producer of gold and silver from 1878 to 1883, until the presence of underground water prevented deeper working. This celebrated district of Tombstone is now being resuscitated and brought into prominence by a consolidation of the more important of the productive claims under one management. After lying practically dormant for nearly twenty years, since the destruction of two pumping plants by fire, more powerful pumps have been placed at the bottom of a new four-compartment shaft sunk 500 feet, or to the water level. This shaft is fully equipped with the most powerful hoisting engines and will be the central shaft for all the mines on the Contention-Grand Central lode. It has been found that pumping in one mine lowers the water level in the other surrounding mines, hence one central pumping plant of large capacity will suffice to unwater the chief mines of the district.

The large piles of old tailings at the Contention mill, on the San Pedro River, are being worked over by the cyanide process.

Amongst numerous gold-mining properties in the Bradshaw district the veins near the Senator mine have been brought to notice under the title of the Storm Cloud mines. They comprise eight full-size claims and six fractional claims. The veins extend in a general northeast and southwest direction. They have been prospected to a depth of about 200 feet. These claims are in a high and timbered belt and are about 12 miles south of Prescott.

The mines of the Poland Mining Company are situated in Yavapai County, 18 miles from the city of Prescott, and connect with it by rail. This ridge or mountain is being pierced from side to side by a double-track crosscut tunnel from the upper waters of Lynx Creek on one side to the valley of Big Bug Creek on the other, a distance of 8,000 feet, and to these connect a branch of the Prescott and Eastern Railway, which give an all-rail outlet to the products of the mines. This tunnel is known as the Poland-Lynx Creek Tunnel.

A 20-stamp concentrating mill has been erected at the Poland mine, and is supplied with eight Wilfley concentrating tables.

The discovery of a gold-bearing vein on stratum in the heart of the Galiuro Mountains, nearly east of the Mammoth, on the San Pedro, caused considerable excitement, being a region but little explored and not known to be gold bearing. The formations are massive rhyolites, with the planes of structure standing nearly vertical, and on their older vertically disposed beds there are later nearly horizontal outflows of rhyolite and of tufaceous beds, as well as hard lava beds filling ancient hollows and channels now high above the modern drainage.

The gold occurs free in visible grains and particles in quartzite rock not readily distinguishable from the rhyolite walls. The chief mineralization has a breadth of some 50 feet, and there are other, but narrower, parallel seams. While rich hand samples can easily be secured, the general average is low, and can be ascertained satisfactorily and conclusively by mill tests only. It is probable that it will not exceed $5 per ton, and may be as low as $3. There is much red hematite, showing the former presence of pyrite, and the little cavities left by the decomposed pyrite often show free gold. The value of this interesting gold deposit or vein can not be shown without free crosscutting and milling of the rock as extracted. The water supply for a great portion of the year is ample for milling or for cyaniding. There is an extensive area of fine timber, in which the cypress is abundant.

There have been some promising discoveries of free gold in quartz near Patagonia, in Santa Cruz County, and they are now under development.

The Arizona Gold and Copper Company is working a group of silver mines from 3 to 10 miles west and north from Patagonia, about 20 miles north of Nogales. The ores are largely argentiferous gray copper and are found in quartz veins traversing diorite, the Trenton being one of the principal claims. The same company has been putting the smelter at Patagonia in repair with the intention of running it when the production of the camp reaches 75 tons of ore a day. New sampling works have been erected in connection with the smelter where lots of ore can be sampled and purchased, and shippers can avoid the cost of transportation to the smelting works at El Paso.

The Salero Mines Company is now developing the Eureka-Mabel group near the Trenton by a crosscut tunnel which gives access to the lode at a low point and at the same time taps a supply of much-needed water. The same association is developing the old Darwin lode by a deeper shaft with a steam hoist and pump.

There has been great activity at Harshaw and Washington Camp. The World's Fair mine, reported sold for $500,000, remains in the possession of the owners who have worked it at intervals for several years past.

Copper.—The leading copper mines of the Territory, notably those of the United Verde, Clifton, Globe, and the Copper Queen at Bisbee, have continued their production.

The successful leaching operations with sulphuric acid at Clifton mark an important metallurgical advance.

Molybdenum.—Increased attention has been given to the ores of molybdenum by reason of an increased demand for the metal to alloy with steel.

The sulphuret, known to mineralogists as molybdenite, is the form in which this substance generally occurs and which is also its most merchantable form. It is found in Arizona at several different places in the Santa Rita Mountains and at a copper-bearing claim in the Dragoon Mountains. In all these localities it is closely associated with quartz and to such an extent as to render it too low to transport profitably, while all efforts to obtain it of higher grade by concentration processes have been futile.

Molybdenum can also be obtained from the acid compounds, notably from the molybdate of lead, the species wulfenite, often wrongly confounded with wolframite, with which it has no affiliations. Wulfenite is a common associate of the decomposed lead ores of Arizona, and to such an extent as to justify the belief that the molybdenum occurs in the form of sulphide in the galenite, i. e., that molybdenite and galenite occur in intimate mixture, and by oxidation the yellow compound of molybdic acid and lead becomes visible. This compound was found abundantly in the auriferous lead ores of the Mammoth mine at Schultz, Pinal County, and shipments of this ore already chronicled were made from there a few years ago.

But notwithstanding the care taken to separate this ore as far as possible from the gold-bearing quartz, it was found to be present in notable amount in the tailings from the mill on the San Pedro. These tailings have been subjected to the cyanide process for the removal of the gold which the mill process failed to get. They form large heaps looking like ordinary sand.

Efforts have been made to recover from this sand-like mass of tailings the small particles of wulfenite by concentration processes, and work at Mammoth during the year has been carried on to this end.

Marble.—Ledges of marble near Bowie have attracted attention. The stone is found in the foothills of the Chiricahua Mountains and near the old military post. Both black and white marble are reported to exist there in large deposits and of superior quality.

A ledge of white statuary marble is found at the north end of the Santa Catalina range near the Condon copper property.

Black and variegated marble exists at the Total Wreck mine, but has not been explored.

Considerable amount of marble of various shades of gray and white, mixed, have been quarried at various places in the Santa Ritas, along the road leading from Vail's to the copper mines, for monumental work at Tucson.

A fair grade of black marble can be had in the Tucson Mountains a few miles west of Tucson.

Diatomite.—Extensive deposits of diatom earth have been brought to general notice by my paper on "Diatom earth" in Arizona, contributed to the Transactions of the American Institute of Mining Engineers at the Philadelphia meetings, February and May, 1892.

This substance occurs in extensive beds, mixed in with fine volcanic ash, along the San Pedro River below the town of Benson. It has many and important uses industrially, but the high cost of transportation renders its exploitation unprofitable at present.

An ancient lake.—The wide extent of the very fine material composing the diatomite beds and other phenomena indicate the former existence of a great lake or estuary of comparatively quiet water between the Santa Catalina Mountains on one side and the Galiuro Mountains on the other. It would appear that this body of water extended as far up the valley as Fairbank and beyond, and that in height it reached nearly to the top of the pan between the Whetstone Range and the Santa Catalina. The horizontal sediments seen in terraced banks about Benson, on the Southern Pacific Railway, are good evidence of the former lacustrine conditions of the valley. The Sulphur Springs Valley also gives evidence of former lake conditions.

LIVE-STOCK INTERESTS.

Mr. H. Harrison, secretary of the live-stock sanitary board, has submitted to me the following report of the condition of the live-stock interests of Arizona for the year ended June 30, 1902:

The live-stock industry still maintains its place as second in importance among the great industrial resources of the Territory of Arizona. The last year has been peculiarly unfavorable to the business of stock raising, by reason of the long-protracted drought, and in the more arid sections considerable loss has been sustained; but, as, if to compensate for this condition, nature has contributed probably the heaviest calf crop ever known in this section, conservative estimates placing it at over 90 per cent.

The assessment rolls of the various counties show a marked decrease in the number of live stock, especially cattle; in fact this tendency has been apparent for the past four years, and is attributed to numerous causes. Arizona has not suffered alone from shortage of water and range feed; the same conditions have obtained in all the range States and Territories, and in most instances have been felt more acutely than here. As a natural consequence, the demand for both feeders and beef cattle has been abnormally heavy, and has taxed the cattlemen to the utmost to meet it. The result has been that almost every available animal has been disposed of that could be spared without depleting the ranges of the necessary nucleus for breeding purposes.

Interest and activity have revived among breeders generally, and the tendency to improve the native stock by the importation of blooded animals is more evident than ever before.

In no section of the United States is the general health of live stock so nearly perfect as in Arizona. The climatic conditions, although so varied over the vast territory involved, are exceptionally unfavorable to the development of the contagious diseases common to live stock. This, coupled with our excellent sanitary laws, and the rigidity with which they are enforced, has resulted in excluding from the ranges the influx of any but the healthiest of cattle.

All live stock offered for shipment into the Territory is subject to inspection at the point of entry by the Territorial veterinarian, which inspection is invariably made, except when such shipment is accompanied by a certificate of health from a competent State veterinarian.

Occasional slight outbreaks of disease have occurred which have been traced to stock that have been brought or strayed in from adjacent countries, and in every instance the most drastic methods have been successfully employed to stamp out such attacks.

The unfavorable conditions referred to, although working a temporary hardship on many, are not without advantages, as a decided check to overstocking the ranges results, inbreeding to an undesirable extent is obviated, and a general disposition to raise a better class of cattle is evident.

Keen competition in all lines has invaded the stock raising and shipping industry, and every year it becomes more apparent that quality must be a paramount consideration to quantity in the profitable handling of live stock. To-day the Arizona product ranks second to none in the great market centers.

Considerable impetus has been injected into the business of horse and mule

raising, due to the brisk demand that has obtained for these animals for military transport and draft purposes. The natural environment of animals raised in this Territory fits them peculiarly for the work required, and they have consequently been in great demand. Owing to the limited interest that has been manifested in horse raising for the past few years the available supply of suitable animals has proven entirely inadequate to meet the demands.

The sheep industry is in better condition to-day than ever before. This is due largely to recent legislation which places the same rigid sanitary safeguards on sheep as has always been maintained on cattle. "Scabies" and other common diseases have been practically eliminated, and the more serious disorders of a contagious nature are absolutely unknown here.

Hog raising is commanding more attention than in the past, and many fine droves of breeders have been recently imported.

During the past year Arizona has shipped out 111,429 head of cattle, 4,587 horses and mules, 2,404 hogs, and during the same period there have been slaughtered for home consumption 37,531 head of cattle.

The assessment rolls of the various counties show live stock with an assessed valuation of $4,314,231.80, divided as follows:

County.	Horses.		Mules.		Asses.		Swine.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Apache	2,507	$30,885.00	48	$1,522.00	148	$1,472.00	67	$194.00
Cochise	3,792	72,504.00	133	3,535.00	69	328.00	118	325.00
Coconino	3,761	68,890.00	61	2,440.00	190	1,020.00	187	1,108.00
Gila	2,790	46,005.00	73	1,650.00	202	1,010.00	353	1,059.00
Graham	4,245	110,747.00	88	3,155.00	233	2,135.00	370	850.50
Maricopa	4,633	90,495.00	234	6,850.00	10	855.00	2,026	6,065.00
Mohave	1,431	45,150.00	9	315.00	34	170.00	54	162.00
Navajo	2,007	36,330.00	21	630.00	76	380.00	92	460.00
Pima	2,959	48,270.00	93	2,320.00	15	75.00	19	57.00
Pinal	2,220	27,480.00	78	1,830.00	89	445.00	218	620.00
Santa Cruz	1,936	9,617.00	76	1,890.00	37	240.00	26	71.50
Yavapai	4,325	80,225.00	129	3,775.00	175	1,074.00	203	735.00
Yuma	1,286	27,951.80	25	620.00	6	70.00	1,908	5,724.00

County.	Cattle.		Goats.		Sheep.	
	Number.	Value.	Number.	Value.	Number.	Value.
Apache	4,143	$60,204.00	620	$1,240.00	91,787	$183,574.00
Cochise	48,207	481,075.00	1,137	2,174.00	4,040	7,380.00
Coconino	13,406	142,846.00	700	1,400.00	140,380	280,760.00
Gila	30,762	308,535.00	9,575	19,150.00	155	310.00
Graham	45,621	467,885.00	7,977	15,672.35	4,102	8,024.00
Maricopa	20,933	277,245.00	1,245	1,820.00	11,770	23,540.00
Mohave	11,005	111,220.00	2,500	5,000.00	215	430.00
Navajo	2,633	34,736.00	175	375.00	70,455	140,910.00
Pima	22,259	227,600.00	10	20.00	5,140	10,280.00
Pinal	15,984	181,020.00	1,000	2,000.00	3,500	7,000.00
Santa Cruz	15,392	151,370.00	.....	.....	.....	.....
Yavapai	24,436	250,254.00	10,728	21,456.00	36,070	72,140.00
Yuma	1,341	16,902.00	.....	.....	.....	.....

In considering the actual numbers and values the above figures must of course be taken as an extremely conservative estimate.

The live-stock law.—Arizona's present live-stock law is probably one of the best and most far-reaching measures that was ever enacted for the government of the live-stock industry. Its enforcement is placed in the hands of a board of three commissioners and a Territorial veterinarian appointed by the governor. Under its provisions the administration is divided into two distinct branches, viz, the sanitary, which pertains to health and quarantine matters, and is under the direct supervision of the Territorial veterinarian by direction of the board; and the brand-recording and inspection service, which is directed by the board, through its secretary, from the office of the board.

The duties of the veterinarian are to keep in touch with the health condition in all parts of the Territory; to investigate and report to the board any case of infectious or contagious disease that he may find; to advise with the board on all matters pertaining to quarantine and sanitary regulations, and, under the rules of the board, to inspect for health all live stock entering the Territory. The board is further empowered to

authorize him to destroy any infected animals that may menace the health of the live stock of the Territory.

All persons owning range cattle, horses, mules, asses, sheep, or goats are required to adopt a brand or mark by which they may be distinguished, and said brand or mark must be a matter of record in the office of the board. This record comprises 8,635 brands. It is made the duty of the board to prevent the record of conflicting or duplicate brands.

Upon the sale of the brand and before any transfer is noted on the records a duly acknowledged bill of sale is required to be filed with the board, which is recorded. The transfer is then effected and a new certificate issued.

It is further made the duty of the board to devise a system of inspection for health, and for brands and marks of cattle at the railway loading stations, and also of all cattle slaughtered for food within the Territory, and to appoint inspectors, whose duty it is to enforce the laws and make the said inspections. All inspectors are required to file a bond in the sum of $500, running in the name of the Territory, conditioned on the faithful performance of their duties. Regular reports are required from all inspectors of their official acts, which are kept on file in the office of the board and are open to public inspection at all times, forming a complete record of over 100 districts. The compensation of inspectors is a 5-cent per capita fee, paid by the person for whom the inspection is made.

The butchering of cattle, sheep, swine, and goats for food is subject to the supervision of the sanitary board, and all persons before engaging in such business are required to procure a license to butcher. The amount of the license fee is determined by the population of the town where the business is to be conducted and ranges from $30 to $150 per annum. The fees derived from these licenses are placed in a special "license and inspection fund" in the hands of the Territorial treasurer, to be drawn upon by the board for the compensation of the inspectors, but at least 10 per cent of all such moneys must be turned into the general fund of the Territory. This provision has been in force only since March, 1901, and has proven of great benefit to the people of the Territory, guaranteeing as it does the quality of the meat product offered for public consumption and safeguarding the butchers and cattlemen against theft.

Another advantage that can not be overestimated is that every licensed butcher is required to slaughter at a fixed place, to which the inspector has access at all times; the cattle to be slaughtered are subject to inspection both before and after slaughter, and as a result the practice of butchering on the range and the vending of meat by irresponsible parties has been effectually checked.

The hides of all cattle slaughtered are inspected for brands and marks and a complete record kept in the office of the board, compiled from the reports of the inspectors.

During the past year there were 95 butchers' licenses issued, from which was derived the sum of $5,280, and during the same period there was paid to inspectors the sum of $4,985.53, and to the general fund of the Territory $1,170.67.

The board has been extended the most valuable assistance in suppressing the unlawful handling of cattle by the "Arizona Rangers," whose services have been most effective. This organization, although less than two years old, has succeeded in breaking up some of the worst gangs of rustlers that have infested our ranges, thereby relieving the live stock board of one of the gravest problems it had to contend with.

With a few minor changes, which will be suggested in the biennial report of the board, we believe the law fully covers the ground for which it was framed, and will continue to prove of the greatest possible protection and benefit to the live-stock industry of the Territory.

The Territory has recently enjoyed liberal rains, and the outlook is brighter than for many years for the stockmen.

The ranges abound in good feed, and already the feeders of the Salt River and other valleys are looking forward to the activity of the coming season. Indications are that the demand for beef cattle will be greater than ever during the next few months, owing to the general shortage of feed and conditions already alluded to.

WILD ANIMALS OF ARIZONA.

Mr. Charles A. Montgomery, a hunter and trapper of many years' experience in Arizona, has contributed some facts concerning the wild animals of this Territory. His description of the big game comes from observation covering a period of thirty years of active life in the

mountain regions of Arizona, and he is recognized among hunters as authority upon the subject, which he presents below in an interesting and instructive manner. Mr. Montgomery says:

The elk rightly takes the lead among the game animals of Arizona. I am sorry to say that the number of elk now left in Arizona is very small. I know of but two small bunches, one in the White Mountains of Apache County and the other in the Blue Range in Graham County. To preserve this remnant the full force of the law should be used. Unless something is done to prevent it their extermination is a matter of but a few years.

Of the deer family there are six different kinds in Arizona, namely: The blacktail, whitetail, fantail, mule deer, burro deer, and Papago or spotted deer. The blacktail, the first to feel the exterminating force of the hunter, is still with us, ranging from the northern portion as far south as the high mesas. Of late years, however, they are not often found below the pines.

The muledeer, first cousin to the blacktail, is somewhat more shy and its habitat is less exposed to the hunter. The blacktail still roams over a large portion of the middle and southern counties of the Territory, ranging in the lower country and sometimes found well out on the flat country, mixing with the burro deer.

The burro deer, a small, compact, gray animal, which retains its color of ash gray all the year around, is distinctly separated from other species of the deer family. The burro deer takes on its fat in the spring and summer months. The only fat ones I ever killed was in June and July. Positive facts concerning these animals are little known by naturalists, and I have never yet seen a description of them. The whitetail and fantail are so near kin that the casual observer can see no difference; yet one exists, and he who studies can discover it, even when the animal is doing its best to get out of reach of your gun. The habitat of these animals is in all parts of Arizona, high and low, among the pine, the oak, the juniper, and the mesquite. I believe the whitetail and fantail deer will be with us when all other deer are gone.

The Papago or mottled deer are very rare and hard to find. The existence of this animal has been questioned by many hunters, but live specimens can yet be found. The habitat of this deer is the dry and almost inaccessible plains of southern Arizona. To give a better description of this deer would require a trip down in their country, which at this time of the year is very disagreeable. The Papago or mottled deer is the smallest of the deer family. The last one I killed weighed 17 pounds and was a doe fully matured.

The antelope or pronghorned is still to be found in portions of the Territory, but are fast disappearing.

The mountain sheep or big horn have been driven to the most isolated regions of the desert and in a few years more they will have disappeared and become extinct.

Of the bear family there are five species, three known to hunters as "tree climbers," and two species known as the "long claws" or "ground fighters." Of the tree climbers, the large brown bear is the most destructive to cattle, and is to be found in all portions of the Territory. The cinnamon bear is smaller, longer, and leaner than the brown bear and harder to find. In fact, I have seen but five animals of this kind west of the Rio Grande in the last twenty-five years. The small black bear is plentiful in some portions of the country, and being the only species of the bear family good for man to eat, I hope it will be with us to the end. Of the long claws, the grizzly and silver tip are one and the same. They are to be found high up in the mountains in the summer, and during the fall months they come down to oak, juniper, and grapes. The little gray bear, whose average weight is about 400 pounds, belongs to a class by himself. I have killed but three, and know nothing about them only that they are small, compact in build, and of a gray and black color mixed, and I consider them the most vicious animal, with one exception, we have in Arizona. He will spring and fight and is hard to kill.

Of the large cat family there are three kinds: The jaguar or American tiger, rarely found far away from the southern border; cougar or mountain lion, found all over the Territory, and the puma, a smaller animal than the cougar, rarely exceeding 6 feet in length from tip to tip, but very smooth of build and quick in action, and a great lover of chickens and other domestic fowls.

There are also three kinds of the bob or wild-cat. The wolf family consists of the lobo, a large animal with a tawny and brown color, and when running in bands they are very destructive to range stock. The gray or mountain wolf is seldom found below the pine belts of the high mountains. The keiliola or prairie wolf, in partnership with the bussarel, are the most valuable scavengers and range over the entire country. The red fox, crop (or silver-gray) fox, the small gray fox, the civet cat,

the raccoon, pine squirrel, gray squirrel, and the rock squirrel are all found in Arizona.

The beaver is still found in portions of the Territory. The wild turkey, quail, and ringneck pigeon are also found here.

HUNTING AND FISHING.

Mr. W. L. Pinney, member of the fish and game commission of Arizona, has prepared the following report upon the subject of hunting and fishing:

The tourist who comes to Arizona may expect to find at any season of the year as fine shooting as may be had in any portion of the United States. Being a newly settled country, not a great deal of attention has been paid to hunting as a sport by the local inhabitants until within the past few years, and during that time an efficient system of game wardens carrying into effect the game laws in force in the Territory has caused a marked increase rather than a decrease in the large and small game of Arizona. The Federal game laws have proven of great advantage to the officers of the Territory in protection against the sale and shipment of game.

In central and southern Arizona, in the summer, the white-winged dove (*Melopelia leucoptera*) is found in great numbers. They are probably the finest shooting in the world. Experienced wing shooters are frequently able to kill a hundred of these swift-flying birds within an hour or two. These birds are so numerous in the farming sections as to be almost considered a pest at times.

The quail common to the Pacific coast (*Callipepla gambelii*) are found throughout the Territory in abundance. The open season is from October 15 to March 1. Quail are hunted more than any game we have. Since the passage of the last game laws, prohibiting the trapping and marketing of game, these birds have multiplied rapidly. The duck and goose season is the same as quail, and they are found in abundance along the rivers and irrigated sections of the valleys and in the lakes of northern Arizona. Probably no finer shooting ground for wild fowl exists than the mouth of the Colorado River at the Gulf of California, 60 miles below Yuma. This trip is frequently made by sportsmen in the winter. Wild turkeys, grouse, snipe, rail, and other game birds are found in various sections of Arizona. Efforts to introduce bobwhite quail and imported pheasants have so far not been very successful.

The killing at any time of camel, elk, mountain sheep or mountain goats, and female deer is prohibited; also antelope until January, 1906. The deer season is open from November 15 to December 15, and they are so plentiful that a number were killed last winter within 10 miles of Phoenix, and not over a mile from the cultivated farms of the valley. Guides may be had in any of the larger towns of the Territory for parties who wish to hunt big game. Bear and mountain lions are still numerous in the wooded mountain regions; these animals are destructive to cattle and sheep, and the generous bounties offered by the Territory for their scalps have resulted in a great many of them being killed.

The mountain streams of northern Arizona abound in brook trout and bass, and offer practically unlimited sport. The warm-water streams in central and southern Arizona are filled with fish peculiar to this section, noticeably several varieties of suckers and the Colorado River salmon. Carp and a couple of varieties of the catfish are found in abundance in these streams. Bass and other fish are being introduced and are doing finely.

NATURAL SCENERY.

Nature has given to the world no picture more beautiful than the Grand Canyon of the Colorado in northern Arizona. The marvelous beauty and sublimity of this great gorge is fast spreading the fame of this Territory to all portions of the world as the home of wonderful natural scenery. An adequate impression of its bewildering phases of grandeur is scarcely conveyed to the mind by description; only those who have stood on the rim of the canyon and looked down upon the great expanse of eroded, carved, and painted earth can appreciate fully this great work of nature. The traveler finds in it a power of concentration which holds him a prisoner to its charms; each day brings out

some new phase of beauty, the gorge deepens, its borders stretch farther on, and the great spectacle gradually passes beyond the power of the mind to comprehend. The impression it makes defies all other scenes to rob it of the place it holds supreme.

During the past year a railroad has been completed to the rim of the Grand Canyon, and thousands of travelers have taken advantage of this opportunity to visit the canyon. Hotel accommodations are provided, and visitors are guided into the depths of the gorge, where they may explore the wonderful scenes presented on every hand. The railway runs from Williams, on the Santa Fe Pacific, and the distance to the canyon from that point is 65 miles. A stage line runs from Flagstaff, taking passengers through to the canyon over a fine mountain road rich in scenery of exceptional grandeur. The distance from Flagstaff is 74 miles.

The natural bridge is another attractive place which is visited by travelers who care to go into the mountains on an overland journey, and in point of interest it is regarded as one of the wonders of nature which is well worth a long journey to see. The natural bridge is in northern Arizona, and is reached from points on the Santa Fe Pacific Railroad. The people of Arizona frequently go there in numbers during the summer time to camp and hunt.

Among other points of great interest are the cliff dwellers in Yavapai and Coconino counties, Montezuma's well and castle in Yavapai County, the Casa Grande ruins in Pinal County, the old San Xavier Mission in Pima County, the petrified forests in Navajo County, and numbers of ancient ruins of prehistoric interest in different portions of the Territory.

Arizona possesses a wealth of mountain scenery which is unequaled in attractiveness by any mountain region of the United States.

INDIANS.

PHOENIX INDIAN SCHOOL.

The following report of the advancement of the Indians at the Phoenix school was submitted by Mr. C. W. Goodman:

The Phoenix Indian Industrial School was established and a superintendent appointed in January, 1891. The school was opened in the West End Hotel the following September, with 31 boys. The number was soon increased to 42 boys, which taxed the capacity of the building. Mr. Hugh Patton, a Pima Indian, now the day school teacher at Gila Crossing, was the first teacher. May 6, 1892, the school was transferred to its permanent quarters on the 160 acres of land 3 miles north of Phoenix. This quarter section was valued at $9,000, of which the Government paid $6,000 and the citizens of Phoenix donated $3,000.

Since then the school has grown until there are now about 30 buildings for the 650 pupils and 56 employees. The extensive grounds are well cared for and quite ornamental, and the school is quite a resort for Phoenix people and their friends.

The average attendance for the fiscal year of 1902 was 657. The following 28 tribes were represented, coming from all parts of Arizona and seven or eight other States and Territories: Apache, Arapaho, Chemehuevi, Chippewa, Comanche, Hopi, Hupa, Klamath, Little Lake, Maricopa, Mission, Mohave, Piute, Papago, Pawnee, Pima, Pueblo, Rogue River, Shoshoni, Siletz, Snake, Hualapai, Washoe, Willow Creek, Yaqui, Yuki, Yuma, and Zuni.

About 100 mixed-bloods have been returned to their homes and their places are being filled with full-bloods and others having a much larger per cent of Indian blood than those returned.

The appropriation for 1903 provides for 700 pupils, an increase of 100 over the previous year. Purchase has been made of an additional 80 acres, which is located 1 mile east of the school and is under the Grand and Arizona canals. The soil is

excellent for gardening and fruit raising, and water to supplement the flow in the canals will be developed by pumping from wells and can be had at from 40 to 50 feet in depth. The wells on the original farm are being enlarged and deepened, and a pumping plant will be put in to supply the 160 acres. Alfalfa and grain can thus be grown in great abundance where now it is difficult to raise feed enough for a few cows and work horses.

During the year an auditorium was completed at a cost of about $7,500, and a bath house for girls at a cost of $4,500. Plans are being prepared for new buildings, which have been authorized at a cost of $34,000.

The class-room work is thorough and the excellent course of study promulgated by Miss Reel, superintendent of Indian schools, has been adopted. A class of six completed the common-school work. Their essays and orations caused surprise, on account of their thoughtfulness and originality, to many in the large audience that greeted them.

But the industrial work is properly given the most prominence. The boys are well trained in the trades and agricultural industries, and the girls in housekeeping and domestic arts. Special courses are given in domestic science and sloyd and manual training, including mechanical drawing. During the year the boys have been in demand, not only for work on ranches, but at their trades, a number of them getting $1.50 to $2.50 a day from contractors and others. The Indians of Arizona are learning to take their place among the peaceable, law-abiding, and useful citizens of the Territory.

PIMA AGENCY.

Mr. Elwood Hadley, of the Pima Indian Agency at Sacaton, submits the following interesting report of the progress made by the Pima Indians during the past year:

Pima Agency is located at Sacaton, Ariz., 16 miles north of Casa Grande, on the Southern Pacific Railway, which town is our railway and telegraph station. From Casa Grande there is a stage daily, except Sunday, to Sacaton carrying the mail and passengers.

At the beginning of the fiscal year 1902 there were under the control of this agency the Gila River, Salt River, Gila Bend, and San Xavier Reservations, four in all, with a total population of between 5,000 and 6,000 Indians, of the Pima, Maricopa, and Papago tribes. There are besides between 2,000 and 2,500 nomadic Papago wandering about the country south of the Southern Pacific track, over whom the agent has little more than nominal control.

On the 19th of April, 1902, the San Xavier Reservation, on which there are about 500 Papago, together with all the nomadic Papago in Pima County, was separated from this agency by order of the Department, and placed in charge of J. M. Berger, for many years farmer in charge at San Xavier.

The lands of the reservation were allotted several years ago, and the Indians, having water for irrigation, are self-supporting and fairly prosperous.

The lands of the Gila Bend Reservation, about 120 miles west of Sacaton, have also been allotted, but the Indians having very little water and no prospect of getting more, have been obliged to eke out a living as best they can.

Very few have attempted to improve their allotments. Anything like progress is impossible, and I am more than ever of the opinion, which I expressed in my former reports, that as soon as water is obtained for the Gila River Reservation the Gila Bend Indians should be brought here and allotted lands, of which there is a great plenty waiting only for irrigation.

On the Salt River Reservation the condition of the Indians has not changed greatly during the past year. They have water enough to make them self-supporting, and their progress toward civilization is steady. The plan of self-government, instituted at my suggestion, which I mentioned in my report of last year, still works satisfactorily.

The Indians live at peace with each other and their white neighbors. They will make good citizens whenever the Department decides to allot the lands of the reservation, and the sooner this is done the more rapid, in my opinion, will be their progress.

The Gila River Reservation is much larger than either of the others in my charge, and on it live the greater part of the Pima, together with the Maricopa, who occupy the extreme western end, and of whom there are about 350 left.

While the condition of the Indians on this reservation is far from what is to be desired, a fact owing altogether to the lack of water for irrigation, nevertheless,

despite this and in the face of poverty, their progress during the four years of my administration has been marked. I can see great improvement in their habits and customs, and a wish to attain the civilization of the white man. They have become very industrious when any encouragement is offered, and exhibit an increasing desire for better clothing to wear and better houses to live in, and they grow more and more friendly toward schools.

Long hair and paint are rapidly becoming things of the past, and the habits of civilization are becoming a part of their everyday life. When the San Carlos reservoir shall have been completed and the Gila River Reservation watered the Indians will be in a condition to appreciate the advantages offered them, and will make rapid strides toward independence and good citizenship. When that time comes, with brick schoolhouses and churches dotting fertile lands, with their children well fed, going to and from school; with enough and to spare for their stock, it will be hard to find a happier and more prosperous people.

Four years ago the Indians claimed that the Government ought to keep them. Now that sentiment is entirely rooted out and a sense of their obligation to the Government has taken place. When opportunity to help themselves offers they are anxious to work. Their progress, however, must necessarily be slow until water is provided for their lands, the lands allotted in severalty, and each Indian made to feel that his success in life depends upon his own efforts.

They have always been a nation of farmers and need only water and a little competent instruction to undertake successfully any form of agriculture which may prove most profitable.

Their lands would be admirably adapted to the cultivation of the sugar beet, and that industry would prove very remunerative.

The Indians on the Gila River Reservation, granted water, could raise enough beets to justify the establishment of a good-sized beet-sugar plant, and I have been assured by capitalists that the factory would soon come if the industry were once established.

FORT APACHE INDIAN AGENCY.

Mr. C. W. Crouse, Indian agent at Fort Apache, submits the following report of the condition of the Apache Indians:

This reservation comprises about 2,000,000 acres, yet not more than 2,000 acres of it are fit for farming purposes on account of its mountainous character, and as there are only 2,000 Indians to whom this reservation belongs, it is seen that each Indian has only 1 acre of farming land, while he has almost a thousand acres of very rough mountainous land that is wholly unfit for use by Indians except for the purpose of stock raising. This reservation lies north of Salt River (Black River) in Gila, Navajo, and Apache counties. The northern fourth of the reserve, from the crest of the Mogollon Mountains, is covered with fine timber suitable for lumbering purposes, but it is of little benefit to the Apache for he is not allowed to use any of it, except what he can be induced to put in a house for himself. The law is such that he can not sell any of his timber after it has been made into lumber, even to contractors here on his own land.

It is said that there are some good mining prospects on this reservation. It would be a public benefit (including the Indians) should Congress make a law permitting any citizen of the United States to prospect this reserve under proper restrictions, locate any property he chooses, and give the Indians 10 per cent of the output.

It would be a great wrong to throw open their land to so-called settlement of the whites, for there is no part of this reservation not already occupied that any white man would use as a home. Only cattle and sheep owners would be benefited in such a move, and, granting that it is a splendid place for stock raising by our white brethren, why would not stock grow on it just as well for Indians, when properly directed by their agent? In my opinion, the salvation of these Indians lies in the herding industry, and it is not at all visionary to say that within three years they can be made wholly self-supporting; in fact, they earn 75 per cent of their own support at present, for there is nothing furnished them except on the ground of charity; that is, for the very old and helpless, and to those who have not yet had an opportunity to help themselves.

It is not generally known, but it is a fact that the Indians of this agency never have been rationed only six months of the year, and they are better Indians because of it. They have been compelled to sacrifice a little more than their relations of the San Carlos Reservation, and they are better for it; yet they are not very good

Indians, their chief vices being drunkenness, gambling, lying, and bigamy. But the wonder is that they are not worse than they really are, for they have been propped up so long by the Government and have been compelled to sacrifice so little that they have grown careless, wasteful, and despondent.

Notwithstanding the notorious record of these Apaches and all that has been said about them to disparage, yet during the past year they have earned and sold more than $25,000 worth of the products of their own labor. They have received this amount of money from the sale of wild hay, corn, barley, charcoal, and wood to this agency and to the military at Fort Apache. During the ensuing two or three years it would be difficult for them to live if they had not the market at Fort Apache. I have so managed the affairs of the Indians here during the past year that they have now a credit of more than $9,000, which is about $4.50 per capita. This amount has been raised and saved in the following ways: I reduced their beef rations last year in amount 25 per cent, and by so doing saved for them $3,000, and I inaugurated the plan of grazing the lands they could not use themselves for want of stock, and I have already collected from this source more than $6,000. When the grass is not consumed by stock it is usually consumed by forest fires, and with it goes many thousands of dollars worth of fine pine timber. The intention of the Government is to have me invest about $10,000 in the purchase of sheep and cattle as a beginning of the herding industry, but you have already noticed that we have realized almost the amount to be expended.

SAN CARLOS AGENCY.

The Apaches are located on the Fort Apache and San Carlos reservations. By nature they are wild, nomadic, and warlike, and only within recent years have they adopted peaceful pursuits. They are now making steady advance, especially in agriculture.

Mr. Stephen James, acting Indian agent at San Carlos, submits the following description of the condition of the Apache Indians:

For years it has been estimated that the Indians here earn two-thirds of their living, one-third being supplied by the Government ration.

The census shows a decrease of 437 over last year. This is partly accounted for by the excess of deaths over births of 61 to 27. But the main cause has been the departure of a large number to earn their own living and seek homes off the reservation.

There were 325 Indians punished during the year for various petty offenses, and one was convicted in the courts of murdering his wife and was given a life sentence in Yuma.

The agent marries the Indians, and they are made to conform to the marriage laws of the Territory as nearly as possible.

The Indians have the reputation of being good workers; the main trouble being that they will not stay with a job. They worked on a road for a mining company at Bowie with entire satisfaction, and also near Globe. The Indians adapt themselves to any kind of labor very readily. There are a number who are fairly good miners. Many of them have lately been working for the Southern Pacific Railway. I do not think that they have the least desire or intention of making any trouble, as in the old days. The old ones are too old and the young ones are more familiar with baking "powder" than any other kind.

The following statements show the condition of the Indians in civilization, agriculture, and other pursuits:

Total Indian and mixed-blood population, 2,578; males, 1,225; females, 1,353; number of Indians who wear citizens' dress in part, 1,732; number of Indians who can read, 670; number of Indians who can use English enough for ordinary intercourse, 1,060; number of children of school age, 577.

Number of acres of land cultivated, 2,450; number of acres fenced, 7,000 (the Indians are required to work the roads on the reservation); bushels of wheat raised, 2,129; bushels of barley raised, 1,785; bushels of corn raised, 1,500 (this is the smallest crop in years on account of the severe drought).

Last year's crop was as follows: Wheat, 14,913 bushels; barley, 16,868 bushels; this was probably 20 per cent above the average.

Tons of hay cut by Indians, 180; cords of wood cut (sold at $6 per cord), 1,150; value of Indian products sold to the Government, $12,269; horses owned by Indians, 2,400; cattle owned by Indians, 1,004.

OTHER ARIZONA INDIANS.

Navaho Indians.—The Navaho Indians are a pastoral people, having tended herds and flocks from earliest times. Their reservation contains about 12,029 square miles, the greatest part of which is valueless. The land is adapted for raising sheep and goats, and some of the wool is used by the Indians to make the famous Navaho blankets. Cultivation of the soil can be carried on only in the mountain valleys and along some of the streams. The flocks of the Navaho have suffered greatly during the last ten years on account of the steady decreasing rainfall and the resulting scarcity of water and vegetation. The number of sheep and goats, estimated as nearly 1,000,000 in 1890, has been constantly decreasing, until now the number scarcely exceeds 500,000. Another contributing factor is the drought, which has caused an almost total failure in crops; in consequence, the Indians are forced to slaughter their flocks to keep from starvation. In addition to sheep and goats, the Navaho raise large herds of Indian ponies. The crops raised in recent years have not been sufficient to support over one-fourth of the population. The Navaho own nearly one-half of all the goats in Arizona. The number of fleeces reported by them is exceeded only by Apache County, but the product is much lighter and of poorer quality.

The report for this reservation includes only about one-half of the Navaho tribe, relating only to the Indians on the reservation. The scarcity of vegetation has forced about one-half of the tribe to wander over parts of New Mexico, Colorado, and Utah, in order to maintain their flocks and herds.

Moqui Indians.—The Moqui, or Hopi, Indians are not reservation Indians. They live in pueblos similar to those of the Pueblo Indians of New Mexico. Their reservation embraces an area of about 55 miles east and west and 65 miles north and south. The water supply is very limited, and irrigation is carried on in the primitive Indian method. The Moqui are provident and self-supporting. They have been known to have a supply of corn and dried peaches on hand from two to four years. The principal crop is corn, of which they raise nearly as much as the other tribes of the Territory combined. Other products are sweet corn, squashes, beans, and melons. The majority of farms are patches of from 3 to 20 acres, a few having as high as 30 acres under cultivation. They also possess large flocks of sheep and goats. The Moqui are the only Indians reporting orchard products to any extent. Peach trees to the number of 15,541 are reported as owned by them.

Colorado River Reservation.—The Colorado River Reservation, the home of 650 Mohave, extends for 60 miles along the Colorado River and contains about 240,000 acres. A portion is subject to the annual overflow of the Colorado River, but the larger part requires irrigation to raise a crop. It is estimated that nearly the entire valley could be irrigated with an inexhaustible supply of water at a nominal expense. The land thus irrigated could support nearly all the Indians of Arizona.

The resources of the reservation are very great. The soil is as fertile as any in Arizona, and crops will grow the year around. All fruit trees indigenous to southern California thrive here.

Wheat is the most successful crop of the Mohave, but barley and

corn do well. The vegetables usually grown are beans, melons, and pumpkins. A centrifugal pump recently installed irrigates about 500 acres.

Papago Indians.—The Papago, or San Xavier, Reservation embraces an area of 105 square miles. The chief occupation of the Indians is agriculture, in which they are making steady progress, although they have experienced many drawbacks. They are industrious and economical, spending the money received from their crops on improved machinery and in building new homes.

EDUCATION.

Arizona boasts of the public school system which is in force throughout the Territory, embracing a comprehensive course of education, from the primary grades of the common schools to the higher branches of science in the normal schools and the University of Arizona. Education is compulsory in Arizona, and the enforcement of this law has been the means of greatly increasing the school attendance during the past two years. The advancement of education during the past year has been marked, the report of the superintendent of public instruction showing an increase during the past two years of 4,426. The enrollment in the public schools for the same period shows an increase of 2,699. An increase of eighteen school districts is noted during this period, the present number of districts being 275. The grammar and primary schools have increased 54, there being 452 at the present time. The number of teachers employed is 457, an increase of 58. The average salary paid to male teachers in the Territory is $85.51; of female teachers, $71.75. Thirty-seven new schoolhouses have been built during this period.

The valuation of school property in the Territory has increased from $529,024 on June 30, 1900, to $654,942 on June 30, 1902. The total receipts for school purposes has increased from $421,776.15 for the year ending June 30, 1900, to $531,191.38 for the school year ending June 30, 1902, an increase of $109,415.23. Expenditures for school purposes have increased from $345,314.29 to $401,235.59, an increase of $55,920.90; valuation of school libraries has increased from $6,245 to $8,582, an increase of $2,237; valuation of school apparatus has increased from $20,530 to $21,408, an increase of $878.

The twenty-first legislature wisely abolished the county boards of examiners, doing away with county certificates. The examinations at present are conducted in the several counties by the county superintendents, and the answers are sent to the Territorial board of examiners for marking and grading.

The successful applicants receive Territorial certificates which are valid in all counties of the Territory. This insures a uniform system of grading and certification throughout the Territory. The regulations relating to the system of certification of teachers will compare favorably with many of the older States and communities.

A teacher from any State must hold a diploma of graduation from a State institution of learning, such as a university, normal school, or college of high rank, authorized by the State in which it is located to certificate its graduates to teach in the public schools of that State; otherwise an examination in one of the counties of Arizona for a Ter-

ritorial certificate is required before he or she is allowed to teach in any of the public schools of the Territory.

The graduates of the two normal schools of Arizona who have followed the profession of teaching have proven successful educators, and their diplomas are recognized in many of the States without further examination or certification.

A summary of school statistics, as prepared by the superintendent of public instruction, appears below:

Summary of school statistics.

	1901.	1902.
Whole number of children—		
Between 6 and 21	23,435	25,259
Between 8 and 14	11,574	12,822
Enrolled in public schools	17,817	19,208
Average daily attendance in public schools	10,921	9,514
Percentage of school population—		
Enrolled	76+	76+
In daily attendance	47	38—
Cost per capita—		
On population	$14.63	$15.11
On enrollment	$19.15	$19.41
On average daily attendance	$30.66	$34.82
Number of new districts organized	15	11
Number of districts lapsed	3	11
Number of new schoolhouses built	18	19
RECEIPTS.		
Amount received from—		
Territorial fund	$11,457.62	$22,951.05
County taxes	181,204.74	195,609.01
Poll taxes	46,553.64	69,734.72
Special district taxes	13,079.80	14,126.59
Sale bonds and interest	11,929.17	118,871.21
License fines and other sources	70,429.97	34,950.91
Balance on hand June 30	74:947.89	130,955.85
EXPENDITURES.		
Amount paid for—		
Teachers' salaries	$214,265.58	$224,599.86
Libraries	366.46	357.55
Apparatus	3,335.48	2,137.44
Building and furniture	27,528.17	60,954.23
Bonds, including interest	17,155.13	24,550.19
Repairs, full and contingent expense	74,187.98	61,529.53
Miscellaneous purposes	.....	27,106.79
Total expenditures	336,838.80	401,235.59
Total bonded indebtedness	.....	301,737.00
Valuation of school property	612,929.00	654,942.00
NUMBER OF TEACHERS EMPLOYED.		
Whole number of male teachers employed	112	118
Whole number of female teachers employed	333	339
Total number of teachers employed	445	457
Average salary per month paid male teachers	$80.83	$85.51
Average salary per month paid female teachers	$64.31	$71.75
Total number of high schools	1	2
Total number of grammar schools	124	122
Total number of primary schools	307	330

UNIVERSITY OF ARIZONA.

The University of Arizona is recognized as the leading educational institution of the Southwest and ranks well among the universities of the United States. The advancement has been rapid and substantial during the past year, the graduating class being the largest in the history of the institution.

The report of the president of the University of Arizona, Mr. F. Yale Adams, which follows, covers the progress and improvements made during the past fiscal year and includes a comprehensive statement of the university:

Buildings.—All the buildings were painted during the year and have been wired for electric lights. A new dining hall 50 by 104 feet, brick, with hard-wood floors, was completed June 1, 1902. This building will seat 210 students; contains also cloak rooms, kitchen, bakery, and laundry, furnished at a cost of about $7,000, and is an addition which has been long needed. Congress has approved the act of the last Territorial legislature providing for an issue of bonds for $25,000 for the construction of a library, museum, and administration building for the university, and plans for its construction are now being considered.

Equipment.—The usual additions have been made to the library, including among other valuable works, a complete set of the Journal of the Institute of Mining Engineers. Many additions have been made to the apparatus in the physics and chemical laboratories. A beginning has been made in a complete botanical survey of the Territory. A Pratt & Whitney 14-inch engine lathe has been added to the equipment of the mechanical engineering department, together with many small tools, making this now one of the best equipped shop departments in the West. There have been many additions to the museum during the year, including mineral specimens, birds, a large collection of prehistoric relics, and part of the skeleton of a whale. The military department has received 100 Springfield cadet rifles, with full accouterments, and a 3-inch muzzle-loading rifle with carriage and accessories.

Faculty.—For the first time in the history of the university, a Regular Army officer has been detailed as military instructor. Capt. G. W. Cole has given excellent service, and the spirit of the students has been commendable.

Courses.—The requirements for entrance to the subcollegiate department have been advanced one year, making it the equal of the best preparatory and high school in the country. The new courses in engineering have been offered for the first time this year, one in mining engineering and one in civil engineering; also, one new course in physics and one in advanced shopwork. The class in mining engineering spent a week in careful study of the works at Clifton and Morenci.

Attendance.—The total enrollment for the year was 215. Each class showed an increase over the same class last year, the increase in college students being especially remarkable—an increase of 55 per cent over last year. The class graduated in June, 1902, numbered 9, the largest in the history of the university.

In general, the university has shown a marked degree of progress during the past year. The spirit in the student body is excellent, there being a noticeable absence of hazing or roughness, while all seem to be animated by loyalty to the faculty and the university.

Origin.—The university was established by an act of the thirteenth legislative assembly of the Territory in 1885. The bill was introduced into the council by Hon. C. C. Stevens, of Tucson, carried through the house by the able efforts of Hon. Selim M. Franklin, and approved by the governor March 12, 1885. A tract of 40 acres of land was given by the citizens of Tucson as a site. The university was opened to students October, 1891.

Design.—The purpose of the university is, in the language of the organic law, "to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science, and the arts," and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose instruction is especially provided in agriculture, the mechanic arts, and in mining and metallurgy. The agricultural experiment station, a department of the university, is wholly engaged in developing the agricultural resources of the Territory. The institution aims to fill in the Territory the place occupied in the States by the State universities. That the university may be of service to all, a subcollegiate department is maintained.

Organization and administration.—The government of the university is vested in a corporation styled the board of regents of the University of Arizona, consisting of

the governor of the Territory and the superintendent of public instruction, ex officio, and four other members appointed by the governor.

Location and climate.—The University of Arizona is located at Tucson, one of the largest towns of the Territory. Tucson is on the main line of the Southern Pacific railway, 312 miles west of El Paso, Tex., and 500 miles east of Los Angeles, Cal. The town lies in a broad, flat valley at an elevation of 2,400 feet above sea level and is surrounded by mountains. Its dry, healthy situation with its mild and equable climate has made Tucson a famous winter resort. The winter climate is especially good; the temperature is cool and strengthening, but not severe, the lowest temperature recorded during the average year being about 20° F. above zero. But little rain falls during the winter; fogs are unknown; cloudy days are rare, the percentage of sunshine throughout the winter being greater than that recorded at any other place in the United States. Owing to the extreme dryness of the air the highest temperatures are less oppressive to the senses and less dangerous to the health than the summer heat of the Upper Mississippi Valley States. The total amount of rainfall averages less than 12 inches.

Site.—The university is situated upon high ground about a mile from the business center of Tucson, with which it is connected by a street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The location can not be surpassed for healthfulness. The water supply of the university is drawn from a well on the premises 100 feet deep and is of unusally good quality.

Buildings.—The main building, University Hall, is 200 by 105 feet, two stories in height, the first story of gray stone, the second of red brick, and is completely surrounded by a wide 2-story veranda. The building contains the offices, recitation rooms, laboratories, and apparatus rooms of the various departments, an assembly room, the libraries of the university and experiment station, and the Territorial museum. Adjoining the main building is the mining annex, 80 by 60 feet, equipped with metallurgical machinery. Three brick houses, 2 stories high, are occupied as homes by the president and instructors.

North Hall, a dormitory 2 stories in height, built of gray stone of fine quality, originally provided as a home for male students, has been refitted for the use of young women. It contains a students' dining room, kitchen connected therewith, 16 rooms, each large enough to accommodate two students, and a reception room.

South Hall, a fine brick dormitory containing 40 rooms, with bath and toilet rooms, has been recently built for the use of male students and instructors.

A substantial brick building contains a suite of rooms for the use of the commercial assaying department, the rooms being furnished with a large melting furnace, with necessary muffle furnaces and other accessories.

Joined in continuous structure with the assaying building are the shops of the mechanic arts department, occupying an area of 80 by 95 feet, containing a room for mechanical and free-hand drawing, and the machinery and appliances for the working of wood and iron.

Other buildings are the boiler house, which also contains the well and pumps whereby the water supply for irrigation and general purposes is obtained, a greenhouse, 80 by 21 feet, a propagating house, the cottage occupied by the domestic science, and a temporary wooden building used for various purposes.

Equipment.—The library, containing 7,000 bound volumes and 11,000 pamphlets, is open to the use of all students. The books are new and standard. A valuable feature of the library is the collection of complete sets of scientific and literary periodicals, which are of special service in research work.

Museum.—The seventeenth legislative assembly of Arizona passed an act establishing a general museum at the university. The object of the museum is to collect materials of all kinds illustrating the resources and development of Arizona, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants.

Donations of specimens and collections will be received and acknowledged with thanks, but no special provision has yet been made by the legislature for the support of this department aside from a small appropriation for the salary of a curator.

The collections now displayed at the university comprise representative series of minerals, ores, and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen, at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and abroad. Great numbers of valuable specimens are now stored in trays, preparatory to classification and distribution in cases. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

Living accommodations.—Provision is made as far as possible for furnishing board and room to students of both sexes upon the university grounds.

Young men have excellent quarters in South Hall, a new dormitory building.

North Hall, the home of the young ladies, is in charge of an experienced and capable preceptress, who has constant supervision of those rooming there.

Rooms contain a clothespress, and are provided with single bedsteads, table, chairs, mirror, washbowl, pitcher, and slop jar. Students will supply their own lamps, brooms, mattresses, pillows, sheets, blankets, towels, napkins, rugs, and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms, under the direction of the instructor in charge.

Fees and expenses.

	Lowest.	Highest.
Tuition, free		
Matriculation (paid but once)	$5.00	$5.00
Laboratory and shop fees, varying according to courses, per annum	1.00	30.00
Books, per annum	5.00	20.00
Board, per month	15.00	18.00
Lights per room, per month	.25	1.00

College of agriculture and mechanic arts.—The courses offered in the college of agriculture and the mechanic arts provide a liberal training for young men and women along literary and scientific lines and for young men along engineering, mechanical, and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the course in engineering is more rigid in its requirements. Full details of the various courses follow. In all the courses the aim is to combine the practical with the theoretical in instruction. The needs of our young and growing Commonwealth are kept in mind, and in all courses some instruction is provided which has for its aim the making of good citizens.

Arizona School of Mines.—The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology, and their applications. The two years' course in assaying is designed to prepare students for assaying only. The bureau of mines and assaying, while not directly connected with the work of instruction, affords with its laboratory and the influx of new material a valuable object lesson to the advanced students of mining and metallurgy.

Organization and work.—The agricultural experiment station is a legally constituted department of the university, whose purpose is "to aid in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

With the above objects in view, the organization of the station includes the departments of administration, agriculture and horticulture, animal husbandry, botany, and chemistry, the whole or the major portion of the time of one or more members of the station staff being devoted to each department of the station work. Provision is made for meteorological and entomological work also, though to a less degree.

Owing to the wide variation in agricultural conditions in Arizona, it has been found of advantage to distribute the work so that each department is located so far as possible in the situation most favorable to the accomplishment of its own special results. According to this principle, the various lines of experiment-station work have been distributed as follows:

The director's office and the departments of botany and chemistry are maintained at Tucson, in the university buildings. Through this arrangement the experiment station profits by the buildings, libraries, and associations of the university, while the university is benefited from time to time by the teaching ability of members of the station staff. It has been found that from this base of operations the three greatest agricultural districts of the Territory—Salt River Valley, the Lower Colorado, and the Upper Gila—are accessible with equal convenience for field work and observation.

On the same grounds—fitness in location for the work undertaken—the experiment-station farm has been maintained and is being constantly strengthened at Phoenix. Salt River Valley is intermediate in elevation, in situation, and in mean yearly temperature between the other two farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there are capable of the most general application in the Territory at large.

On the same principle again, the date-palm orchard is located in the alkaline dis-

trict south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid Southwest.

The range station also, for the study of worn-out range country with a view to its reclamation to usefulness, is located in a typical district near Tucson, and is conducted under the auspices of the department of botany.

The services of specialists in various subjects, such as entomology, meteorology, and soil-survey work, have also been secured from time to time.

The results of the experiment-station work are made public at frequent intervals in the bulletins and reports of the station. These publications are made in two series: First, the longer and more technical bulletins, stating in considerable detail the investigations as they mature; and, secondly, the Timely Hints for Farmers, which are brief writings issued at the time when they will be most useful, written in plain language and presented in popular form. The annual reports are for the most part written popularly, and afford a convenient and reliable summary of each year's work as it comes to completion.

General information.—In this department the university offers the work of a model high school, with the added advantages of shopwork and drawing and of domestic science.

Students of sufficient age who have finished the study possible to them in their home schools are enabled to continue their preparation for college at the university under the most favorable circumstances.

The equipment of the scientific laboratories is available for use in the subcollegiate work wherever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college department, several of whom regularly conduct subcollegiate classes. By reference to the course of study which follows it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies further, while it gives a good preparation for college.

Bureau of mines and assaying.—In accordance with the act of the legislature of the Territory approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona and for others at fixed rates established by law.

To meet the requirements of this work a special laboratory building of brick has been erected and maintained. It is fitted up as a complete assay office, and is provided with a double large brick coke furnace, a melting furnace, and gasoline furnaces in a fireproof room. There are, in addition, a parting and wet assay room, a balance room, and office.

Extreme accuracy and excellence of work are considered of more importance than pecuniary profits. All assays are made in duplicate, and if not accordant are repeated. A special expert assayer is employed, and the assays are not made by students, who receive their instruction in the laboratories of the main building.

The money received for assaying is deposited monthly to the credit of the assay fund, which is used to pay the assayer and the cost of materials and apparatus.

Course of study.—The following course of study will be required of all students who fit themselves at the university for entrance to the freshman class in 1903. Such variations will be made from it during the next year as will adapt it to the case of students already in the subcollegiate department.

Military drill and physical culture are required of all able-bodied students throughout the course.

[Numerals indicate number of recitations per week. Subjects marked * are elective. Two subjects from the electives must be chosen each year for the last three years.]

First year.—English and English reading, 7; commercial arithmetic, 3; American history, 2; elementary science, 5; drawing and shopwork or domestic science, 5.

Second year.—English and English reading, 4; algebra, 5; *bookkeeping, 5; general history, 3; *Latin, 5; *agriculture, 5; drawing and shopwork or domestic science, 5.

Third year.—English and English reading, 5; plane geometry, 5; civics, 2; parliamentary practice, 1; *physiology ($\frac{1}{2}$), chemistry ($\frac{1}{2}$), 5; *Latin, 5; *French, 5; *Spanish, 5; *German, 5; *stenography, 5; *drawing and shopwork or domestic science, 5.

Fourth year.—English and English reading, 6; algebra ($\frac{1}{2}$), higher arithmetic ($\frac{1}{2}$), 4; parliamentary practice, 1; *physics, 5; *Latin, 4; *French, 4; *Spanish, 4; *German, 4; English history, 3.

Mathematics.—The course in arithmetic begins with percentage, and includes a thorough review of the remainder of the subject. Special stress is laid on thoroughness and accuracy and a comprehension of the unity of the subject. Much time is

given to the mental examples in order to develop accuracy and rapidity in all mental operations.

In algebra special attention is given to the transition from arithmetic to algebra, to the fundamental operations, and especially to factoring. The course includes as much as is found in any good text-book of algebra through quadratic equations.

Plane geometry occupies one year. This is so taught as to develop orderly habits of thinking and investigation. To that end much original work is required, including practical problems involving the application of the principles learned.

English and English reading.—The course in English embraces grammar, composition, and rhetoric, besides a critical study of assigned classics. It begins with a systematic study of grammar. Throughout the whole course attention is paid to work in composition, the aim being to enable the student to express himself clearly, accurately, and with ease. In rhetoric much attention is paid to the principles of style and expression. The English classics studied in this department are those required for entrance to the university.

Under the general head of English reading the students are given drill in the elementary principles of reading and elocution. Much of the required work in preparatory English is done under this head.

The course in English reading aims to enable the pupil to comprehend the best thoughts of the best authors and to acquire a taste for good literature.

The work includes a thorough study of the elements of modulation, emphasis, and an elementary training of the voice. By far the greater part of the time is devoted to a somewhat careful study of selected classics.

The text-books in use during 1902–3 are those of the entrance requirements in English.

History.—The aim in all the work in history is to lead the pupil to see the development of races and nations along political, social, and religious lines, and to arouse in him a love for the subject and a habit of broad and discriminate reading.

American history is reviewed during the first year. Montgomery is used as a text-book with Smith's Topical Manual, but much collateral reading is required, and the institutional side of the history is made prominent.

The work of the second year includes ancient, mediæval, and modern history and the leading facts in the political development of races and nations. Adams's European History is used, supplemented by the reading of references contained therein.

Fiske's Civil Government in the United States is the text-book in civics. The historical development of the subject is made prominent, while practical problems, such as taxation and municipal government, are made the subject of special study and investigation.

Coman and Kendall's History of England is used as the text-book in the fourth year.

Drawings and shopwork.—This course in manual training is the preparatory course leading up to the college mechanics arts course. The work consists of both drawing and shopwork, between which subjects the student's time is about equally divided. The course covers three years and is designed to furnish a thorough elementary knowledge of manual training as taught in the subcollegiate schools of the country.

First year—Drawing: Free-hand; lettering; geometrical designs; historic ornament. Shopwork: Wood carving; geometrical designs; historic ornament.

Second year—Drawing: Instrumental; geometrical constructions; orthographic projections. Shopwork: Joining and wood turning; cabinetwork and wooden ware.

Third year—Drawing: Mechanical drafting; shop drawings; free-hand drawing; free-hand working, sketching, and sketching from nature; lettering. Shopwork: Forging, pattern making, and molding.

Domestic science.—The course in domestic science is arranged to give instruction in the science and art of home economics and to raise home-making to a higher plane. It includes all branches of home science, hygiene, chemistry of cooking and cleaning, preparation of all food stuffs, both fancy and elementary.

Two courses are offered in sewing. The first year includes fancy needlework, and the second year drafting, cutting, and dressmaking. The course includes laundering of lace and ribbons, nursing and food for the sick, marketing, and management of servants. Social duties and customs of society are considered with particular care. The students have access in the domestic science library to all the best authorities.

Bookkeeping, stenography, and typewriting.—Bookkeeping is taught by the modern budget system. The work is individual, and each student may progress as fast as his time and ability permit. The course is thorough in all the details of office practice. The course includes instruction in commercial law. A complete course in stenography is offered, the Pitman system being used. The department is equipped with Remington typewriters.

Parliamentary practice and debate.—The two higher classes in the subcollegiate department devote one period of each week to work in parliamentary practice and debate. The classes are organized under a regular constitution and by-laws.

Instruction is given in parliamentary law, Roberts's Rules of Order being used as a text-book.—The members are required to introduce resolutions and prepare debates upon them. They are also given practice in performing the duties of secretary and in presiding in the meetings.

Science.—It is the object of the course in science to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation, and logical deduction; to acquaint the student with the fundamental facts of the various branches of science, and to give full practice in the use of good English in describing various observations and experiments.

An introductory laboratory course is given in the first year. The third year is given half to physiology and half to chemistry, pursued on the laboratory plan. During the fourth year a rigid course is given in physics, fully covering college preparatory physics, with ample experimental work. Abundant apparatus and laboratory facilities are supplied for all these courses.

Agriculture.—It is not intended here to anticipate the work prescribed in the regular college course in agriculture, but rather to present certain practical elementary phases of the subject found to be of especial value in this region. The course will deal with many of the varied problems which confront the Arizona farmer and will be of exceptional benefit to those who have spent some time on an Arizona farm and are accordingly acquainted with existing agricultural methods. The Timely Hints published by the experiment station will be closely followed when applicable, the bulletins of the various stations carefully examined as the subjects may demand, and the students will be encouraged to preserve for future use valuable references in the way of bulletins and other agricultural works.

Such subjects as the following will be discussed, and to the extent possible, illustrated by means of experiments:

Weeds—their means of propagation and dissemination, their frequence and abundance, and methods of eradication. Life history of fungi causing common plant disease, with methods of control. Treatment of insect pests. Collection, preservation, and germination of seeds of economic trees and shrubs, with proper methods of tree planting and proper trees to plant for forests, fruit, or ornament. Irrigation of gardens and fields; things that must be known before successful irrigation is possible. Practicability of constructing dams to hold storm water for agricultural and grazing purposes. Forage plants of the Territory, including grasses, salt bushes, and other plants; their reproduction and conservation; study of these plants from the experiment station grass garden. Range reclamation and restoration; study of experiment station range reserve. Soils—treatment of; also adaptability to various plants.

General information.—The departments and courses of study of the university are arranged as follows:

I. College of agriculture and mechanic arts: A literary course leading to the degree of Bachelor of Philosophy; a scientific course leading to the degree of Bachelor of Science; an engineering course leading to the degree of Bachelor of Science; an agricultural course leading to the degree of Bachelor of Science in Agriculture; a chemistry course leading to the degree of Bachelor of Science in Chemistry.

II. School of mines: A mining engineering course leading to the degree of Bachelor of Science in Mining; a two years' course in mineralogy and assaying; a bureau of mines and assaying.

III. Agricultural experiment station.

IV. Subcollegiate department: English, classical and scientific courses; manual training and domestic science courses; commercial course.

Summary.—Graduate students 4, seniors 10, juniors 11, sophomores 11, freshmen 17, unclassified collegiate 20, fourth subcollegiate 22, third subcollegiate 50. first subcollegiate 57, unclassified subcollegiate 13; total, 215.

TEMPE NORMAL SCHOOL.

Mr. Charles H. Jones, secretary of the board of education of the Tempe Normal School, in his report submitted to me July 1, 1902, describes this important educational institution as follows:

Of the public institutions of Arizona, the Tempe Normal School is one of the most progressive and successful. It has graduated 160 young men and women.

Origin.—The school was established at Tempe by an act of the thirteenth legislature, in 1885, and until 1890 employed but 1 teacher.

In 1893 the enrollment reached 87, and 3 teachers were employed, since when the school has grown rapidly. The building then occupied was a small one-story structure, badly crowded, whereupon appropriations were made by the sixteenth and seventeenth legislatures for a new building, which was begun in 1894 and completed in 1897, at which time the registration had reached 150 and the faculty numbered 7 members.

In 1899 one year was added to the course, placing it upon an equality with other recognized normal schools. This act of the board at first had the effect of diminishing attendance, but in the past two years it has been increasing, till the present year roll has 137 in the normal school proper and 48 in the practice school.

Course of study.—During the past two years the four-year course adopted in 1899 has been thoroughly systematized and mastered by the classes of 1901 and 1902, each consisting of 18 members. Of the class of 1901 all but 2 taught in the public schools of Arizona last year, and, according to the reports of the county superintendents, are giving excellent satisfaction. Most of the class of 1902 were engaged to teach before they graduated, and at the present writing all are engaged in town or country schools of Arizona.

The work of the school is divided into three courses, as follows:

1. The normal-school course of four years.
2. The subnormal course of one year.
3. The training-school course of five years.

The work of the normal-school course includes the following departments, each being in charge of a member of the faculty who is a specialist in that particular line of work: English, mathematics, science, professional instruction, military, physical culture, history, civics, economics, and manual arts, including commercial subjects and vocal music.

The course is so arranged that students who do not intend to teach may take an academic course of three years and omit the professional studies. This course is as complete as that of the best academies, as the equipment of laboratories and library are elaborate and the teaching force most excellent. Credits secured from this course are accepted by the University of Arizona and the University of California.

An elective course of Latin will be introduced this year. Any student completing the full course, including Latin, can enter any of the universities without examination.

Buildings.—Training school: Since the last biennial report the old Normal School building has been remodeled into a training school, at an expense of about $1,500. It is a one-story brick structure, 70 by 60 feet, with a broad veranda entirely surrounding it, and a 10-foot hall extending through it from north to south, and, so far as environment is concerned, leaves little to be desired. The building is commodious, and the grounds are large and attractively laid out and furnish ample room for recreative sports and for a school garden.

The building contains four class rooms and the principal's office, and is equipped with all the aids employed in the best schools. It is under the charge of a skilled instructor, who is held responsible for the progress of the pupils, but the pupils are instructed by the students of the senior class under her supervision.

The amount of time devoted by each student of the senior class to actual teaching in the training school is equivalent to six hours per week for thirty-six weeks. There are at present 48 pupils enrolled in the training school, representing a class in each of the first four grades of the public-school course, with 12 pupils in each class. This limits the practice teaching and methods of our graduates to primary work, which of course is the most important, but a broader field should be furnished them for working out the theories and methods of the grammar-school work. Classes should be formed in the training school representing at least the first seven grades of public-school work. In order that this may be accomplished, the training school will have to be enlarged so that the seven necessary class rooms will be available, and the teaching force of the model school would have to be increased. This of course would represent a considerable expenditure of funds, but it is an all-important question and must receive consideration in the near future if the normal expects to follow along the lines of professional progression and give our graduates the same chance for preparation, by actual practice work, as is afforded by other State normal schools.

Dormitory: By an act of the twenty-first legislature a tax of 2 cents per $100 for two years was levied for the purpose of building a dormitory for the accommodation of the lady students of the normal. It was thought at the time that this levy would amount to nearly $15,000, while in fact the amount secured will be about $12,000.

A building is now in course of construction which, when completed and furnished, will cost about $12,000. It is expected that this building will be completed by September 15, and it will be of great benefit to the institution. The only trouble is

that it is too small and entirely inadequate to meet the demands, as is illustrated by the fact that all of the rooms are already engaged. The building is of brick, 56 by 39 feet, two stories and a basement. It will accommodate only 26 roomers, besides the help, but the kitchen and dining-room facilities in the basement will accommodate about 50 boarders.

It is very evident that the present building will have to be enlarged so as to accommodate at least 60 roomers, or a new building will have to be constructed and the present one used for a boys' dormitory.

The normal, being a Territorial institution, adequate provisions should be made for the students of the Territory, as many parents in the remote portion of the Territory will not send their daughters to the Normal School to prepare for the work of teaching unless they are confident that ample provisions are made for their comfort and supervision by the normal authorities, and if such provisions are not made, the institution will lose many worthy students and the Territory many excellent teachers.

Grounds.—The normal campus covers an area of 20 acres, and the buildings are located on the north half. This was planted to ash trees, and but little effort was made toward systematic arrangement.

During the year 1900–1901 $1,875 was expended on the grounds, and during the year 1901–2 $226 was expended. This does not include the salary of the gardener, who is employed at $60 per month. During the two years the 10 acres upon which the buildings are located have been newly laid out by an experienced landscape gardener. A fine system of graveled drives has been constructed and bordered with grass plats and lined with trees and shrubbery, the latter having been selected with a double purpose in view—that of beautifying the grounds and at the same time furnishing illustrative material for the work in botany. Many species of palms, cypresses, a large collection of rose bushes, oleanders, pepper trees, umbrella trees, and various other plants and trees foreign to this region have been planted, and a tract has been reserved for the typical plants of the desert, including the cacti, of which a large number have been obtained. The campus includes a parade ground for military drill, a basket-ball ground, and tennis courts.

A space is also set aside for a garden, which is used in connection with the nature work in the training school and the classes in botany.

While great improvements have been made in this direction, much still remains to be done. The normal grounds should be made the most beautiful in the Territory. Nothing is wanting; soil, water, and climate are all that could be desired, and by continuing along the lines outlined by Landscape Gardener Smith, of Phoenix, there can be no doubt but the normal grounds would become the pride of Arizona.

The plans as outlined two years ago were never completed, on account of scarcity of funds. This should be done at once, in order to secure uniformity in appearance and growth of shrubbery. The plan should also be extended so as to embrace the grounds of the new dormitory building. Something should also be done with the south half of the grounds, at present writing a field of weeds. A portion of it could be utilized for an athletic field and the remainder planted to trees and shrubbery preparatory to the erection of other buildings. This improvement could be made with but little expense and would contribute greatly to the appearance of the premises.

The fence surrounding the beautiful grounds and fronting the building is not only dilapidated in appearance and out of harmony with everything else, but on account of decay will have to be repaired in many places. This fence should be removed from the north, east, and west sides of the north half of the campus and replaced by a good fence that would be in keeping with the grounds and buildings. The old fence could be utilized in the south half of the campus.

Equipment.—During the past two years many improvements have been made in equipping and furnishing the building, which prior to that time could not be accomplished on account of the lack of the necessary funds. In the report only the most important ones will be mentioned.

Art department.—Realizing the pedagogical value of all forms of manual training, an art department was furnished with models, easels, drawing tables, chairs, cases, charts, and all the incidental supplies necessary for a first-class drawing department. This department is now in charge of a specialist, and the results are very satisfactory. The cost of equipping this department was about $500.

Ladies' room.—In an institution where the attendance is composed very largely of ladies it is necessary to have a ladies' retiring and reception room. This room was fitted up with suitable carpet, rugs, easy chairs, curtains, couches, tables, etc., at an expense of about $200.

Library.—During the past two years the most important improvement and the one most required has been in connection with the library. Although a good start had been made in this department and some good books procured, it was entirely inade-

quate to meet the demands made upon it by the teachers and students for seminary courses.

During the year 1900–1901 $500 was expended in the purchase of books, and during the year 1901–2, $1,000 was expended for the same purpose. The library now contains over 3,000 volumes, covering the best of history, science, education, and general literature. Among the additions of the current year was 800 volumes of standard fiction. There is a generous supply of encyclopedias and other general reference books. The professional and historical departments are especially well equipped for conducting work on the seminary plan. The reading room in connection with the library is fitted with serviceable tables, which are well supplied with the leading periodicals—literary, educational, and scientific.

Laboratories.—Among the most extensive and necessary improvements of the past two years are those made in the physical, chemical, and biological laboratories. During that time over $1,000 has been expended for apparatus, furniture, and supplies, consisting of physical and chemical apparatus, compound microscopes, dissecting microscopes, chemicals, tables, chairs, cases, etc.

Military department.—About $100 has been expended in the past year for the military company in procuring swords, flags, bugles, etc.

The cadet company of the Normal School is considered the best drilled military company in the Territory. At the last competitive drill the company was awarded a beautiful silver cup for excellence in company drill and was also awarded both the medals for individual drill.

Summary of advancement and achievement during past two years.—(1) The four years' normal course inaugurated and systematized; (2) the training school reestablished (four years' course); (3) drawing department organized and furnished; (4) music department organized and new piano purchased; (5) faculty increased from 7 to 9 members; (6) diplomas accredited by the State board of education of California; (7) three literary societies organized, victors in Normal-University debate; (8) victors in competitive military drill, both company and individual, 1901; (9) winners of the championship football league cup; (10) greater number of students now doing normal work than ever before; (11) Latin introduced into course for the ensuing year.

Improvements.—(1) New dormitory building; (2) old normal remodeled into training school and furnished; (3) grounds greatly improved; (4) laboratories furnished and equipped with good apparatus; (5) electric pump installed; (6) automatic clock and electric bell system; (7) nearly 2,000 volumes added to library; (8) ladies' reception room furnished; (9) halls and stairways covered with matting; (10) supplies procured for military company; (11) new furniture for many of the class rooms; (12) gardener employed to take care of grounds.

NORTHERN ARIZONA NORMAL SCHOOL.

History and purpose.—The Northern Arizona Normal School, at Flagstaff, was the second normal school established in the Territory of Arizona. The school was opened in 1899, occupying the fine stone building which was built for a reform school, but by the twentieth Territorial assembly was changed into a normal school. The spirit of the act creating the school well sets forth its objects: The exclusive purpose and objects of the normal school shall be the instruction and training of persons, both male and female, in the theory and art of teaching and all the various branches that pertain to a good common-school education, and in all subjects needful to qualify for teaching in the public schools; also to give instruction in the fundamental law of the United States and this Territory in what regards the rights and duties of the citizens.

The Territory maintains an intimate relation to the normal schools and takes a deep interest in their welfare. The Territorial legislature is kindly disposed, and makes reasonable provisions for the maintenance of the work. An element in this good will lies in the fact that the board of education of the normal school give faithful and intelligent service for only a nominal salary, and enjoy in a high degree the confidence of the legislature. The work is in close sympathy with the people, touching the common, elementary, and secondary schools,

reaching out into every hamlet and rural district not less than into the towns and cities, and so serves as one of the efficient instruments connecting the liberal culture of schools with the common life.

Organization.—In its plan the Northern Normal embraces, first, the normal school proper; second, the preparatory department; and, third, the training school. The first of these comprises the following departments of study: Pedagogy, history and civics, music, mathematics, natural and physical science, English, drawing, geography, physical training and methods.

The preparatory classes are organized to accommodate those students who are not prepared to enter upon the regular work, but look forward to teaching.

The training department is thoroughly organized into an ideal graded school, beginning with the primary and extending through the first four grades. The rooms are under the personal direction of the supervisor of this department, who, with her assistants, observes and criticises the work of pupil teachers. Each student before graduating must do at least one hundred and twenty hours of actual teaching under most careful yet friendly criticism. This department is maintained for the sole purpose of supplying competent teachers for the public schools of the Territory.

Nature of a normal school.—For the scholastic and professional training of teachers a normal school is established. The object and methods of work of the normal school differ from the academy and college. The acquisition of knowledge and general culture are the first objects of the academy and college, while the object of the normal school is to impart culture, skill, and learning to its students for a specific and technical purpose—that of fitting them to teach others. The academy considers each branch as a necessary step to a higher branch, while the method of the normal school is that of comparative study of each branch of knowledge in the light of related branches. To teach their students the various branches of knowledge is the aim of the college and academy; the normal school aims to teach its students not only the branches of knowledge, but also the processes by which the learning mind acquires knowledge, and the resultant of these processes.

The normal school is a professional school designed to equip intending teachers thoroughly for their work and to afford to those who are now members of the profession opportunities for better preparation. The essential qualifications of a teacher are cultured powers and a well-informed mind. A teacher must possess knowledge to be able to instruct others. To teach effectively what he does not know is impossible. He should know much more than he attempts to teach. He needs culture for the power that it gives—the power to think, to originate, to influence, and control.

Thorough scholarship lies at the foundation of a teacher's course of study. A normal school should make ample provision for the scholastic and professional training of its students. The course of study arranged by the superintendent of public instruction for the normal schools of the Territory is in accordance with these principles. All the essential branches to give the student general culture and to fit him scholastically for the profession of teaching are included. A careful perusal of the course of study will convince anyone that the work is carefully graded.

Regulations.—Candidates for admission to the normal course proper must present suitable credentials or satisfy the principal by examination or otherwise that they are prepared to enter upon the course of study with profit to themselves and credit to the institution.

Each member of the Territorial legislature has, by law, authority to appoint one student from his county to the normal. Students in the normal course who sign a declaration to teach in the public schools of the Territory after graduation also have an annual incidental fee of $5 to pay. All other students, in both normal and subnormal course, must pay a tuition fee of $20 per year. This incidental fee of $5 is payable in advance at the time the student enters upon his work at the normal. The tuition fee is payable $5 each quarter in advance.

Persons admitted to the privileges of the normal are expected invariably and cheerfully to comply with all the regulations given by the president for the direction and guidance of all students; to observe such study hours outside of school sessions as may be prescribed; to recognize personal responsibility for the property of the Territory in the school buildings and their appointments, and in general character, association, and development to evince worthiness to become recognized teachers and worthy leaders of the youth of the Territory. Disregard of either of these fundamental principles as rules of conduct will be considered sufficient cause for denying the privileges of the school to any student.

Number of studies.—Students can not take less than three nor more than four subjects, except by special permission; and it is presumed that a student can not carry four full subjects who has not passed all his work for the previous term.

General equipment.—Each year brings new requirements to any institution of learning along the line of apparatus, both physical and chemical, as well as books of reference and professional research. The multiplication of the sciences has brought the laboratory into great prominence. The board of education of the Northern Normal has anticipated all these needs. During the present summer vacation a complete chemical and physical laboratory will be completed and fully equipped for individual laboratory work. The reference and professional library has been so carefully selected, with special reference to the needs of the normal, that the number of books alone gives no adequate conception of its working capacity.

Special care and attention have been given to the selection of books in the pedagogical department. These cover the history of education and educational systems, methods of instruction, school organization, government, discipline, and hygiene.

The reading table in the study hall is well supplied by the board with the best educational periodicals and magazines of the day. In fact, by way of equipment in all departments the board, while exercising great care and prudence, has been most generous.

Relations to Territorial university.—By agreement between the governing bodies of the respective institutions the credentials of either are allowed in the other for work covered. This close articulation which exists between the normal and the public schools of the Territory on the one hand and normal and Territorial university on the other is of great advantage to the students both in the public schools and in the normal. The graduates of the eighth grade in the

public schools are admitted to the subnormal course and taken through a well-balanced course of five years, when they should be prepared to graduate at the normal and to enter the university and complete their work there in at least four years.

Advantages.—No more appropriate spot for the location of a school could have been chosen than that selected for the site of the Northern Arizona Normal School, Flagstaff, Ariz. This mountain city, nearly 7,000 feet above sea level, is famed for its fine water supply, its perfect climate, and its beautiful scenery. It possesses, also, the added charm of being situated in the most picturesque portion of America and within easy reach of some of the sublimest scenes in the world. To the north of the city rise, in all their grandeur, the San Francisco Peaks, clothed in their mantle of green, and, at sunset, their veil of purple and gold. The glorious sunshine and the cool, bracing air of this region attract annually hundreds of tourists, who linger to revel in its glories, to enjoy its magnificent scenery and fine roads, and to visit its many points of prehistoric interest.

Scenery.—The Grand Canyon of Arizona, 65 miles north of Flagstaff, is the most marvelous gorge in existence, and is visited annually by thousands of tourists. A trip to this famous spot is an education of itself. Here nature, surrounded by the "forest primeval," with its gnarled trees and tangled network of mistletoe, reposes in all its grandeur, vastness, solitude, and magnificent coloring, which neither brush nor pen can adequately describe. Tourists say that Europe has nothing to compare in grandeur and beauty with this truly sublime spectacle. The Grand Canyon cannot be comprehended at a glance. The first glimpse of it leaves an impression only of vastness and solitude. But a more careful survey brings to view the various strata, the fantastic shapes of its rocks, the wonderful lights and shadows, and the beautiful coloring. There is no place more interesting or beautiful than this gorge, and the privilege of visiting it lies within the reach of all who make Flagstaff a place of residence.

Historical points of interest.—There is no place richer in historical ruins than Flagstaff and its vicinity, for within a day's journey from the city are the cliff dwellers, the cave dwellings, the new caves, the ice caves, and Sunset Mountain; and but a little farther away are located the canyon of the Little Colorado, canyon Diablo, Oak Creek (famous for its trout), and the Verde Valley, with Montezuma's well and castle. Many interesting relics of the race once inhabiting this region are to be found in these places, and a visit to them is fascinating and instructive.

Pure mountain water.—Those places in Arizona which have a good water supply are few and fortunate in the extreme. Flagstaff is one of these. At great expenditure the city is supplied with an abundance of pure, cold, mountain water, piped from the San Francisco Mountains, 16 miles away. The supply has never given out and the quality is excellent.

CHURCHES.

The advancement made in the religious life of the Territory has been most noticeable during the past year. Organizations of the various denominations, strengthened by many new churches and schools in different sections of the Territory, reach out to the most frontier regions. Twenty societies are now represented by resident missionaries,

and organized work is carried on with marked results. The Roman Catholic, Church of Jesus Christ of Latter Day Saints, Presbyterian, and Methodist churches lead in the number of organizations and membership. The ordinances of religion are supplied to most of the communities of Arizona, and the church and Sabbath school follow closely the rise of a new mining camp or other settlement.

The different denominations represented in the Territory at the present time are the Roman Catholic, Church of Jesus Christ of Latter Day Saints, Presbyterian, Methodist Episcopal, Baptist, Congregational, Protestant Episcopal, Christian (Disciple), Free Methodist, Seventh Day Adventist, Dunkards, Salvation Army, Christian Science, River Brethren, Lutheran, Christian Reformed, Faith Mission, Gospel Union, Mennonite.

Handsome church edifices have recently been erected by the leading denominations, notably the Presbyterian churches of Morenci and Bisbee, the latter being now in course of construction. These churches represent the interest and generosity of members of the Phelps-Dodge Mining Company, who have provided means for constructing beautiful houses of worship and also residences for the ministers. At Phoenix the new Roman Catholic Church and the South Methodist are being built. At Douglas a Baptist church has been constructed, and improvements in church property have been extensively made in various communities of the Territory.

The ministry hold an honored place in the community, and are a cultured body of men who interest themselves in movements of good citizenship and the advancement of public morality. The Christian zeal of the ministry is felt in the advancement and betterment of communities in all portions of the Territory.

Among the Indians six mission societies are carrying forward gospel work. The greater number of the Pima and Papago tribes profess the Christian religion, and during the past year new missions have been organized for work among the Navaho, Hopi, and Maricopa Indians.

Reports from the most of the church societies of Arizona are given below, and are presented to show the strength of the various churches in the Territory and the increased membership and the valuation of all church property.

Protestant Episcopal.—Number of ministers, 10; number of members, 1,742; increase during the past year, 225; number of Sunday schools, 9; number of scholars, 548; increase during the past year, 158; number of churches in Arizona, 11 congregations; 5 church buildings, 1 hospital, and 3 rectors; where located, Tombstone, Nogales, Tucson, Bisbee, Phoenix, Douglas, Prescott, Globe, Winslow, Flagstaff, Fort Defiance; value of churches and hospital, $20,000; value of parsonages, $5,000; total value of property, $25,000.

Presbyterian.—Number of ministers, 18; number of members, 2,012; increase during the past year, 337; number of Sunday schools, 22; number of scholars, 2,228; increase during the past year, 461; number of churches in Arizona, 20; where located, Phoenix, Bisbee, Tucson, Clifton, Morenci, Flagstaff, Florence, Casa Grande, Solomonville, Safford, Metcalf, Springerville, Peoria, Chloride, Sacaton, Blackwater, Casa Blanca, Salt River Reservation, Gila Crossing; value of churches, $62,214; value of parsonages, $8,700; number of parochial schools, 1; value of school property, $21,000; total value of property, $91,914.

Methodist Episcopal.—Number of ministers, 20; number of members, 1,142; increase in membership during past year, 55; number of Sunday schools, 26; number of scholars, 1,987; increase in attendance during past year, 397; number of churches, 20; where located, Bisbee, Benson, Flagstaff, Glendale, Globe, Jerome, Kingman, Chloride, Mesa, Needles, Phoenix, Prescott, Safford, Tempe, Tucson, Williams, Willcox, Pearce, Winslow, Yuma, Tombstone; value of churches, $87,000; value of parsonages, $30,000; value of school property, embraced in 10 acres of college property near Phoenix, estimated in value at $100 per acre, making a total value of $10,000; total value of church property, $127,000.

Congregational.—Number of ministers, 7; number of members, 334; increase during the past year, 60; number of Sunday schools, 6; number of scholars, 415; increase during the past year, 50; number of churches in Arizona, 6; where located, Jerome, Prescott, Tempe, Tucson, Tombstone, Nogales; value of churches, $11,300; value of parsonages, $3,000; total value of property, $14,300.

Free Methodist.—Number of ministers, 5; number of members, 50; increase in membership during past year, 2; number of Sunday schools, 2; number of churches, 2; where located: Phoenix, Liberty; value of churches, $4,300; value of parsonages, $650; total value of church property, $4,950.

Fifth Avenue Christian.—Number of ministers, 1; number of members, 200; increase in membership during past year, 28; number of Sunday schools, 1; number of scholars, 100; number of churches in Arizona, 5; where located: Phoenix, Tempe, Cartwright district, Bisbee; total value of church property, $7,500.

Baptist.—Number of ministers, 10; number of members, 558; increase during past year, 62; number of Sunday schools, 6; number of scholars, 553; number of churches in Arizona, 11; where located: Douglas, Mesa, Naco, Phoenix, Prescott, Safford, Tempe, Tucson, Upper Verde, Yuma, Buckeye; value of churches, $19,300; value of parsonages, $2,000; total value of property, $21,300.

Methodist Episcopal Church South.—Number of ministers, 8 Americans and 3 Mexicans; total, 11; number of members, 680 Americans and 102 Mexicans; total, 782; increase during past year, 100 Americans and 2 Mexicans; total, 102; number of Sunday schools, 10 American and 3 Mexican; total, 13; number of scholars, 600 Americans and 100 Mexicans; total, 700; increase during past year, 35 Americans and 10 Mexicans; total, 45; number of churches in Arizona, 7 American and 2 Mexican; total, 9; where located: Phoenix, Bethel, 3 miles north of Phoenix, Tempe, Buckeye, Prescott, near Camp Verde, Solomonville, and Nogales. There are Mexican churches at Phoenix and Nogales. The American parsonages are located at Phoenix, Bethel, Tempe, and Prescott, and a Mexican parsonage at Nogales. Value of churches, $21,400 American and $1,800 Mexican; total, $23,200; value of parsonages, $4,500 American and $1,000 Mexican; total, $5,500; total value of property, $26,550 American and $2,800 Mexican; total, $29,350.

Roman Catholic Church.—Number of priests, 20; number of members, about 40,000; number of Sunday schools, 142; number of scholars, about 4,775; number of churches in Arizona, 39; where located: Phoenix, Tucson, Prescott, Flagstaff, Bisbee, Benson, Tombstone, Willcox, Clifton, Morenci, Nogales, Yuma, Florence, Solomonville, Globe,

Tempe, Wickenburg, Jerome, Congress, Williams, Winslow, Kingman, St. Johns, Concho, Springerville, San Xavier del Bac, Gila River Reservation, Salt River Reservation, and many other chapels.

Church of Jesus Christ of Latter-Day Saints.—This great religious organization is commonly known as the Mormon Church, and its members universally known as Mormons. The progress of this organization in Arizona during the past year affords an interesting description and one which gives much information upon the work which is being carried on by this branch of religious organization. The statements from the different subdivisions of the organization will show the strength of the church in Arizona and the increase in membership during the past year.

By way of explanation of the form of organization, I would say that a stake of Zion is a subdivision of the general church organization such as a State is to the General Government. A ward, or branch of a stake, is a subdivision sustaining a relationship to the stake such as a town or city does to the State. A stake has in it all of the elements of a completely organized church; a ward has in it all that is necessary for a complete and perfectly organized church. An aggregation of wards, conveniently situated with stake authorities, is called a Stake of Zion. The many stakes, with the general church authorities over all, constitute the church.

Then there are three general divisions or heads, i. e., general, stake, and ward. The general authorities consist of three high priests, president, first councilor, second councilor, and twelve high priests who assist and form a traveling high council to take care of all foreign affairs, regulate the stakes of Zion, and see to it that the gospel is preached in all the world. A stake has three high priests to preside, a president, first and second councilors, twelve high councilors who assist at home and whose duty it is to look after the wards, in connection with the presidency, or the first named three high priests. A ward is presided over by three high priests, a bishop, and two councilors aided by twelve teachers whose duty it is to go from house to house and look after the welfare of the people.

There are five divisions of the priesthood; i. e., high priest, whose duty it is to preside; seventies—seventy elders in a quorum whose duty it is to preach the gospel under direction of the twelve apostles. There are about 125 quorums in the church. Elders: Ninety-six elders form a quorum or lodge. The duty of elders is to assist the bishop and others at home. Then there is a lesser priesthood—priest, teacher, and deacon, whose duties it is to aid the bishop and elders at home. Aside from these quorums of men and boys, there is in the church what is called auxiliaries, relief societies composed of the women, Sunday schools for all, young men's and young ladies' mutual improvement societies, literary organizations, primary for children, and religion classes for children also. All of these organizations are known as parts of the ward organizations, with stake authorities to look after them; and in turn there are general authorities over the stake similar to the workings of the priesthood. The president of the church is above all in all the world; the stake president is above all in the stake, and the bishop is above all in his ward.

There are three functions in these presiding officers; i. e., the legislative, the executive, and the judiciary. In each of the three general divisions the three functions are known, and the bishop and associates

form a lower court; the stake a district court, and the presidency and twelve apostles a court of final appeal.

Reports of the progress of the various stakes have been submitted as follows:

St. Joseph stake.—Number of ministers, 20; number of members, 3,600; increase during past year, 300 adult members and about 300 children; number of Sunday schools, 20; number of schools, 1 (L. D. S. Academy high school); number of scholars, 220. This stake is located at Thatcher; Andrew Kimball, president. The St. Joseph stake has 10 wards and 10 branch organizations, all of which form a part of this stake.

Snowflake stake.—Number of ministers, 9; number of members, 1,061; number of Sunday schools, 7; number of schools, 7; number of scholars, 733; number of churches, 6; where located: Tuba, in Coconino County; St. Joseph, Woodruff, Snowflake, Taylor, Pinedale, in Navajo County; value of churches, $13,000; number of parochial schools, 1; value, $6,000; value of school property, $3,000; total value of property, $22,000.

Maricopa stake.—Number of ministers, 7; number of members, 1,274; increase during past year, 74; number of Sunday schools, 5; number of churches, 6; where located: 1 at Pine, in Gila County, and 5 in Maricopa County; value of churches, $20,000.

St. Johns stake.—Number of ministers, 172, in Apache County; number of members, 1,098, in Apache County; increase during past year, 25, in Apache County; number of Sunday schools, 10, in Apache County; number of schools, 10, in Apache County; number of churches, 4; where located: St. Johns, Concha, Nutroso, and Alpine; value of churches, $20,000.

(Requests to numbers of churches failed to bring reports.)

FRATERNAL SOCIETIES.

Throughout Arizona fraternal societies are very strong in membership. Almost every city, town, or settlement has organized societies which hold honored places in their respective communities, and exert great influence in promoting a condition of brotherhood and good will. Every organization of fraternal orders is represented in the Territory, and during the past year the growth has been very great in the membership of these societies.

TERRITORIAL PRISON.

During the year progress has been made at the Territorial prison, which is located at Yuma, on the Colorado River. Material improvements to facilitate the everyday routine work of the prison have provided work for many prisoners, and augmented the living and working capacity of the institution. At the close of the fiscal year the Territorial prison is in better condition than it has ever been in its history.

The superintendent reports that there were 281 prisoners confined in the prison at the close of the fiscal year, June 30, 1902, and the average number in confinement during the year was 273. The preceding year closed with 265 prisoners in confinement, and the average number in confinement during the year was 253.

Of the 281 prisoners in confinement on June 30, 1902, 123 are

Americans, 132 Mexicans, 16 Indians, 8 negroes, 1 Chinaman, and 1 Japanese; 278 are males, and 3 are females. To the Territory of Arizona 261 are credited, and to the United States 20. There were 116 regularly committed prisoners received at the prison during the year and 1 paroled prisoner returned. Of those regularly received, 114 are males and 2 are females; 43 were Americans, 58 were Mexicans, 5 were negroes, 9 were Indians, and 1 Japanese.

The counties accredited with prisoners during the year were: Yavapai, 25; Pima, 19; Maricopa, 16; Cochise, 13; Pinal, 10; Gila, 8; Graham, 5; Navajo, 5; Coconino, 4; Santa Cruz, 4; Yuma, 4; Mohave, 2.

During the year there were discharged 101 prisoners, of whom 62 were by expiration of sentence, 14 by parole, 10 by order of United States court commissioner, 7 by pardon, 3 by commutation of sentence, 2 by expiration of sentence ("canal" time allowed), 2 by death, and 1 by order of court.

Every able-bodied man is given employment throughout the year, and the general health of the prisoners is good.

I have the honor to submit the following report of the improvements and progress made at the Territorial prison, at Yuma, during the fiscal year ended June 30, 1902, which was prepared by Hon. Herbert Brown, superintendent of the prison:

The year has been one of decided growth and substantial improvement at the prison. Extensive and permanent changes have been made in the Territorial property to the betterment of the physical, mental, and moral condition of the prisoners confined in the institution. So for as time and opportunities have permitted, old buildings have been remodeled or replaced by others in accordance with present and future requirements. The work has been well and substantially done, and the material used the best obtainable at the time. As this material, with the exception of adobes and rocks, had to be purchased, the expense attending these changes involved an outlay of considerable money, but they were necessary to the well-being and good government of the place. With the single exception of finishing the cement floors, all the work has been done by convicts, and the expense reduced to the minimum.

These improvements were further extended by the accidental destruction of the straw and brush roof by which one of the old prison buildings had been covered, and gave a much needed opportunity for remodeling the whole building. This building is located south of the dining room and overlaps the north end of the main cell house. It contains the office of the assistant superintendent, storeroom for convict clothing, barber shop, kitchen commissary, a cell room for the cooks and waiters, capable of accommodating, with comfort, 18 men. The building has cement floors, is well lighted and ventilated.

The old dining room would probably seat 150 men, but as the new year opened with 301 it became necessary that other provisions for feeding them should be made. This was done by taking down the north wall of the building and extending it 12 feet. This included the kitchen also, and made ample provision for future increase in prison population; although on the same floor, the dining room and kitchen are separated by an adobe wall, through which a double door has been cut. The dining room is 74 by 30 and the kitchen 24 by 30 feet in the clear. Both rooms have cement floors, plastered and wainscoted walls, redwood ceilings, and are well lighted and ventilated.

The remodeling of the canyon, or corridor, leading to the cell house, and which separates the dining room building from the one containing the assistant superintendent's office by a width of 9 feet, materially improved it in looks as well as usefulness. It was brought under the same roof as the remodeled building, given a cement floor, light, and ventilation.

Second only in importance to the dining room is the new hospital, which is constructed over the west division of the main cell house—the latter being of stone and iron, afforded an excellent foundation. The walls of the hospital are substantially built of adobe and the building is surrounded on both sides and one end by an 8-foot porch. The outside dimensions of the building are 110 by 24 feet. It is divided into two wards by a passage 6 feet wide, one of which is used as a general hospital and the other for those afflicted with tuberculosis. The latter is 15 by 20 and the

former 20 by 42 feet. Each ward has separate bathroom and closet. The pharmacy, reception room, operating room, and attendants' room are in the general building and between the two wards. All have cement floors, plastered walls, redwood ceilings, with abundance of light and ventilation. The entire building, including porches, is protected by wire screen against annoyance by mosquitoes and other pernicious insects. Water to the hospital is supplied from a 4,000-gallon galvanized-iron tank erected on the north end of the eastern division of the cell house. Hot water will also be supplied through a heater which in due course of time will be erected. The elevated position of the new structure is of itself a superior feature from a sanitary standpoint. Easy access to the hospital is had by a stairway on the west side of the building.

The old hospital was simply an excavation under the hill forming the south side of the main yard. With poor light and still poorer ventilation, it was insanitary at its best.

The system of cell ventilation has been greatly enlarged and improved. The new system consists of a 60-inch Buffalo blower, a 3-inch electric motor, and all necessary pipe. The main pipes extend the whole length of the cell corridor and direct connection with the cells is made from it. The system is ample for all present and future purposes and gives full and complete satisfaction. Heretofore the inmates of the cells have suffered severely through the heated months of the summer. The blower and motor are conveniently located over the north end of the cell-house corridor.

Another necessary and important improvement has been made by the enlargement of the electric-lighting plant by the addition of a 16-kilowatt generator. This enlargement not only meets present requirements, but provides liberally for future demands. The capacity of the old generator had already been reached prior to putting in the new ventilating system and lights for the new hospital.

The first improvement made during the year was the substitution of iron bedsteads for the wooden bunks in the cell house. These, notwithstanding they were frequently scalded and whitewashed, could not be kept clean and free of vermin. Bedbugs bred in the wood and it seemed impossible to free it of them. The new bedsteads are made of angle iron, are three tiers high, and are readily movable. They are easily kept clean and wholesome.

The laundry has been greatly improved by the substitution of porcelain roll-rimmed steel tubs for the wooden ones so long in use. The wall against which the tubs rest has been wainscoted, a new cement floor put in, and other useful improvements made.

The bath house also came in for its full share of attention. The old wooden sheet-iron lined tubs have been replaced by porcelain lined ones. The old ones were continually rusting out and leaking, and were a continual source of annoyance and dissatisfaction.

A new system of water supply and sewerage has been put in both kitchen and laundry. Heretofore these pipes passed under the floors of the buildings and were a constant source of annoyance and danger. In their present position they are easy of access.

Guard stand No. 2, burned on the night of May 29, has been replaced by a new and more advantageously situated one. Both the old and new yards can be guarded from it.

Three dozen high-post iron bedsteads have been purchased for use in the hospital and guards' quarters. Those for the hospital have been so built that the head of the occupant can be raised or lowered as necessity may require.

A new ventilated ceiling has been put in the tailor and shoe shop. The walls have also been replastered and whitewashed.

A new Knowles steam pump has been purchased to replace the old and worn-out one hitherto in use. This pump will supply water to the hospital tank, feed the boilers if required, and, in a limited manner, can be used in case of fire.

The west end of the dining room has been protected by a large porch or shingled awning; a new floor has been put down in the engine room; and new east and west walls have been put in the building now occupied as bakery, carpenter shop, etc. The walls in question had become dangerous and threatened to fall. The big prison wall was plastered both inside and out, and all wooden buildings and roofs of buildings (of iron and wood) have been given a coat of mineral paint, and all repairs on Territorial property have been kept up.

By gradual process of accumulation the ground surface, or floor, of the yard has grown higher through the course of years until it is higher than the floors of the older buildings, and during the rainy seasons the drainage is toward and into these buildings, and besides the whole yard becomes a slough of mud. To overcome these difficulties and guard against destruction to buildings, a plan of macadamizing the entire yard was decided upon, which work is now in progress, the beginning

having been made about six weeks ago. The plan is to cut the yard to a grade and macadamize in a manner that will last for all time to come. The drainage, which heretofore has damaged the street leading to the prison, will be changed to another direction and will flow through a line of vitrified pipe laid under the macadam. A complete new system of water pipes will also be required before the macadam is laid. To complete the work will require another month or more, but when completed will stand as a lasting monument to a well-directed effort.

This recital of improvement and progress of the year would not be complete were mention not made of the large amount of labor done during the year on "the bank," or hill, adjoining and practically forming the southern wall of the prison. By the removal of this hill, as designed, the yard of the prison can be greatly enlarged and otherwise improved, as will ultimately be required to meet the conditions of the future. The rock and certain of the other material so removed are the principal resources of the prison for buildings and repairs. The work so done represents the almost constant labor of 50 men.

THE PRISON SCHOOL.

This school was started about two years ago. It, of course, is wholly for the benefit of the prison inmates, many of whom have taken advantage of the opportunities offered and have profited greatly thereby. During the fiscal year there were enrolled 69 pupils, and the branches taught were English, Spanish, and German languages, arithmetic, and music. Grammar, writing, spelling, and composition were made a part of the language study. The school term was two hundred and twenty-four days of seven hours each. Of those receiving instruction 16 were white, 47 Mexicans, 2 negroes, and 4 Indians; 51 studied English, 10 Spanish, 1 German, 16 arithmetic, and 13 music. Good and satisfactory progress has been made in all branches.

THE PRISON LIBRARY.

The number of bound volumes in the library remains practically the same as it was at the beginning of the period covered by this report, with the exception of the addition of ten volumes purchased in May, of this year, of Harper's Encyclopedia of United States History. The condition of the old books is not such as could be desired, owing to frequent handling in regular use, both in and out of the library. About twenty of the leading magazines of the country are subscribed for, as well as nearly all the leading illustrated weeklies. A number of daily papers and religious journals are also taken. While the library is open every day in the year and during the whole of the day, or until the convicts are locked up for the night, and when so opened very generally used as a reading room, a considerable amount of reading matter is taken from the library (under the rules) for reading in the cell house and elsewhere during the day and evening hours. Such literature is mostly confined to monthly magazines, illustrated weeklies, and general newspapers. The bound books taken from the library do not average more than about two a day.

TERRITORIAL REFORM SCHOOL.

The reform school for juvenile offenders was established by an act of the legislature of 1901, the same taking effect on March 21, 1901.

Benson, on the transcontinental line of the Southern Pacific Railway, in Cochise County, was selected as the most available place for this institution. The board of trustees of the reform school was appointed by the governor in January, 1901, and the work of selecting a site for the school was taken up at once by the trustees, together with the examination of plans for the building, selecting the material for use in its construction, and letting the contracts for the work. The board of trustees was composed of C. F. Schumacher, of Tucson, chairman; H. Gerwein, of Benson, vice-chairman; H. Buehman, of Tucson, clerk; and their efforts in behalf of the reform school have been at all times ably and conscientiously rendered.

On January 2, 1902, ground was broken, an excellent location having been selected within a convenient distance of the town of Benson,

and on March 9, 1902, the work had so far progressed upon the building that the corner stone was placed in position with fitting ceremonies, numbers of citizens attending from different places in the Territory. The ceremony attending the laying of the corner stone was under the direction of the Masonic fraternity of Arizona.

The building.—The reform school building is of Romanesque architecture and is an imposing and substantial structure. The outside dimensions of the building are 120 feet in length by 54 feet 6 inches in depth; two stories in height, with a basement 50 by 35 under each of the two wings. The stone used is white tufa, quarried from the Tucson Mountains, and faced on the inside with brick manufactured in Benson.

On the first floor are the officers' quarters, consisting of reception room, parlors, dining room, kitchen and bedroom, and large dining room and kitchen for the inmates.

The second floor has 9 bedrooms, 2 dormitories, 2 schoolrooms, and 2 bathrooms. The building is so arranged that the girls' apartments are separated from those of the boys.

The offices and large dining rooms have cement floors, all other floors being of wood. All inside partitions are of wood and plastered. The roof is covered with Spanish metallic tile.

The contractors will complete their work on the 15th of September, 1902, but the building will not be occupied until the legislature provides an appropriation for furnishing and maintaining it. The further completion of the building for use will be taken up during the coming session of the legislature.

The water supply.—The development of artesian water was carried on during the time the building was in course of construction and excellent results were obtained. At a depth of 1,075 feet a supply was developed sufficient for all domestic uses at the institution. Because of the uncertainty of increasing the flow, the board of trustees decided to cease further effort until such time as the institution may need a greater supply, when a new well will be sunk or the first one deepened.

Expenditures.—From the report of H. Buehman, clerk of the board of trustees, I have the honor to submit the following statement of the expenditure of the appropriation, submitted July 28, 1902:

As near as I can estimate, the amount of the appropriation made by the last legislature will be about $33,000. The amount expended when the present contract is completed will be in the neighborhood of $28,600, leaving a balance of the appropriation of about $4,400. This amount would be almost sufficient to complete the building for occupancy.

Following are the disbursements during the year ending June 30, 1902:

Fifield & Gallagher (contractors)	$16,560.00
Insurance	510.00
Publishing of bids and notices to contractors	226.63
Artesian well	1,303.75
Pipe, hauling water and freight, artesian well, etc	442.79
Expert, artesian well, etc	18.35
Office furniture	15.50
Architect	741.39
Stationery	22.40
Rent	70.00
Incidental expenses, including telegraphing, typewriting, postage, drawing contracts, notary public, hotel bills, railroad fare for members to attend meetings, etc	156.67
Total	20,067.48

NEED OF A REFORM SCHOOL.

Arizona has for many years felt the necessity of a reform school for juvenile offenders. Boys and girls convicted of serious crimes have been placed in confinement in close proximity to hardened criminals, oftentimes the accommodations of the county jails rendering it necessary to place boy prisoners in the same cell room. Confinement as punishment under such conditions might never meet the intention and aim of the law, since the environment is always such as to turn the mind of the youthful prisoner to thoughts of lawlessness, owing to the criminal braggartism of hardened prisoners which constantly meets their ears and occupies their moments of reflection.

At the present time there are several boys confined in county jails throughout Arizona who have committed grave crimes; but, owing to their years, it has been deemed unwise to send them to the Territorial prison to live and work among criminals. The necessity of a reform school, where these young offenders may be confined and educated in work which will fit them for usefulness in later years, was never so apparent in Arizona as it is at the present time, and the reform school at Benson will be welcomed by the people of the Territory.

NATIONAL GUARD.

The report of H. F. Robinson, adjutant-general of the Territory of Arizona, of July 1, 1902, for the fiscal year ended June 30, 1902, is in part as follows:

Organization.—"The organized militia shall consist of ten companies, organized as infantry or cavalry as the commander in chief shall deem most expedient, and such other special corps as may be hereinafter prescribed." (Military Code, art. 11, sec. 1.)

The special corps prescribed are the medical department, a signal corps, and a regimental band.

The actual organization consists of eight companies, of which six companies are in good standing, and two companies, while maintaining the organization, have not for some time held regular drills and are not receiving any money from the Territory.

Within the past year one company (A of Thatcher) has been mustered in, and one (K of St. Johns) having fallen below the minimum prescribed has been mustered out.

The law prescribes that the companies forming the National Guard of Arizona form a regiment of three battalions, which has been done; there being no appropriation for the maintenance of the special corps they have not been organized.

The heads of the staff departments consist of the adjutant-general (brigadier-general), surgeon-general, paymaster-general, judge-advocate-general (all colonels), inspector of small-arms practice (major), signal officer (captain). The adjutant-general is ex officio quartermaster-general, inspector-general, and chief of staff.

"The adjutant-general shall be an officer of the National Guard of Arizona, of the active or retired list, who has held a commission therein for at least three years, or who shall have served in the Regular or Volunteer Army of the United States, and shall have been honorably discharged therefrom, or who shall have served as a commissioned officer for at least four years in the National Guard of one of the States or Territories of the United States, and shall have been honorably discharged therefrom."

In addition to the regular National Guard organization, "the military organization of the University of Arizona, of the Territorial normal school, and of such other educational institutions within the Territory of Arizona as may be supported by national or Territorial funds, are hereby made a part of the National Guard of this Territory." They are to be supplied with copies of all orders and publications from these headquarters and are subject to the same inspection as other companies and battalions. They are to be supplied with ammunition for target practice and awarded decorations for proficiency therein, but do not receive any equipment or any money allowance from the Territory. They are not liable to be called into active service, but may volunteer, and if accepted, during the period of such service they

shall be on the same footing as other troops. There is organized under this provision of the law, two companies at the University of Arizona and one company at the normal school at Tempe.

Military code.—The military code of Arizona under which we are now organized was prepared by myself and assistant and was passed by the twenty-first legislature. The twentieth legislature had enacted, "No money shall be expended for the National Guard of Arizona unless called into active service."

For two years the Guard struggled along, maintaining its existence without Territorial funds or assistance. This office was in the same condition, but I conducted the affairs to the best of my ability, strong in the hope that the next legislature would do something for us. Determined that it should not be my fault if they did not, I began a campaign with the new legislators before election, and by dint of hard work and a full month's time devoted to personal lobbying during the session, assisted by a few friends in the legislature and two or three officers on the outside, the new bill was passed giving each company $30 per month.

Equipment.—The companies forming the Guard are equipped with both the blue fatigue uniform and the khaki uniform, the latter having been supplied them this year. They are also equipped with rifles, belts, canteens, haversacks, ammunition, and materials and equipment for target practice. There is held at the headquarters camp equipage for 100 men, all new the past year, consisting of blankets, shelter tents, wall tents for officers and for hospital, field ranges, dutch ovens, knives, forks, spoons, and cups. These are held for use should any portion of the guard be called out for service, or for encampment use.

The rifles are the .45-caliber Springfield, except that a Company lately organized is to be equipped with the .30-caliber magazine gun. These guns are now at headquarters awaiting shipment. It is hoped that the present Congress will authorize the exchange of the Springfields in the hands of the National Guard for the magazine rifle. A bill for that purpose is now before them.

Personnel.—An army officer (Captain, now Major, Baldwin), who inspected the Guard, in his report to the Secretary of War said: "All organizations visited by me are in a healthy and progressive condition. Judging by the National Guard in the States, I am justified in saying that the National Guard of Arizona is composed of officers and men who have no superiors as soldiers. The National Guard of Arizona is most exclusively composed of men. A look at their clear-cut visages is an assurance that they can be depended upon. I saw no boys with sickly faces or half-developed bodies, too frequently seen in the Guards of the States. The National Guard of Arizona has adopted the Army of the United States as its standard in military matters, and though embarrassed by lack of adequate appropriations, insufficient equipments, and unsuitable armories, yet there evidenced everywhere, by manifest proficiency, that there was a determined purpose on the part of the organizations, at no very distant day, to lay claim to a superior degree of excellence. The National Guard of Arizona is not perfect, but it is in a highly creditable condition. It has healthy and strong military sentiment. Its officers are, as a rule, zealous and competent, and under discouraging circumstances have labored hard and laid a foundation on which, in time, there will be developed a very superior Guard."

What Major Baldwin has said is as applicable to-day as when first written. During the past year all officers elected have been examined as to their fitness to hold the office before being commissioned, and should this policy be followed in the future, it will result in much good to the guard in the increased efficiency of its officers.

Records.—The muster-out rolls of the Arizona battalion of the First Territorial Infantry, U. S. Volunteers, are in this office, and for their preservation and for reference should be published, and the next legislature should be asked to make an appropriation for that purpose.

For purpose of reference a card index of all members and exmembers of the National Guard of Arizona, so far as possible, should be compiled from the records of this office. Information of this character is frequently wanted, and it can only be found after a long search.

Blank forms.—Upon my assuming office there was but two or three blank forms in use. I have prepared and had printed various blanks for returns, reports, transfer of property, bonds, oaths, enlistment, discharge, etc., necessary for properly conducting the business of this office.

Government aid.—The General Government has furnished all of the equipment used by the Guard, no money having ever been appropriated by the Territory for purchase of supplies. In the past twelve years Arizona has received in equipment to the value of over $20,000.

In conclusion, I may say that while the membership in the Guard is not so large as it has been, the interest and efficiency of the individual was never greater.

ARIZONA RANGERS.

By an act of the legislature approved March 21, 1901, a company of Arizona Rangers was mustered into service for work in the frontier regions of the Territory. Conditions of lawlessness in the remote, sparsely inhabited sections and along the international border line of Mexico made it imperative that some manner of rigid police service be inaugurated for ridding the country of cattle and horse thieves and other desperadoes who constantly threatened the peace and safety of the people residing in these regions.

One captain, 1 sergeant, and 12 privates comprise the company. The men are chosen from the frontier, and are thoroughly familiar with the conditions which they are to meet and improve by their work.

The company of Arizona Rangers was organized soon after the approval of the act providing for it, and the work was begun in earnest. Operations were carried on along the border line and in the remote range country of the Territory. One of the most noted bands of cattle thieves was broken up by the capture of the leaders, and numbers of small bands of outlaws have been taken into custody or driven from the country. The operations of the Arizona Rangers have been most successful, and have materially aided in bringing about a lawful condition in portions of Arizona where, but a few years ago, outlaws carried on extensive operations in cattle stealing.

The Arizona Rangers have proven to be of great service to the Territory, and the work which has so auspiciously begun will be carried on with increased vigor until the country is rid of the objectionable class which gave to this Territory such an unsavory record in years past.

ARTESIAN WATER.

A great deal of interest has been shown during the year in the development of artesian water. There are at present in the Territory wells in the San Simon, Gila, San Pedro, and Santa Cruz valleys. Near St. David, in Cochise County, a number of successful wells are in operation, the water supply being used for irrigation purposes with success. The flow of water in the most instances is through 2-inch pipes. During the present year, however, a flow was developed at the Stone Ranch, near Fairbank, in Cochise County, which comes to the surface in 3-inch pipes. The average depth of the wells is between 300 and 400 feet, although a well was sunk a few months ago and an artesian flow obtained at 60 feet, this being the most shallow of all the artesian wells in the Territory with the exception of the development made near Tucson, in the Santa Cruz Valley, where a flow started when a depth of 15 feet was penetrated.

The subject of artesian water presents one of the great undeveloped resources of this Territory, and development in this direction will no doubt bring profitable results of widespread interest.

The number of flowing wells drilled in Graham County in the past year was 11. The total number of active flowing wells in this district is 24. The average flow of these 24 wells is 100 gallons per minute. Their average depth is 560 feet. The average cost of drilling them was $140, exclusive of casing. It is estimated that a well of the capacity indicated will supply water sufficient for from 25 to 40 acres, according to the character of the soil and kind of crop.

Besides the wells reported, a considerable number were drilled that did not prove permanent, the flow of water being checked by reason of the wells becoming choked with sand, owing to the fact that they were not cased. So far as can be learned, no wells that were properly cased have failed or had their flow of water seriously diminished.

Flowing water has been found at numerous points along the foothills of Mount Graham from Munson's Cieniga as far west as Bear Springs, where several small-bore wells are now flowing.

The slow development of the district may be attributed to the fact that most of the arable land susceptible of irrigation from wells in the belt was located by persons without pecuniary means to improve their property.

Those who have been able to farm their lands intelligently have been well repaid, truck farming being probably the most remunerative.

A proposition to sink a number of wells in the belt and conduct the water upon valley lands with a view to the successful raising of vegetables on a large scale is being discussed and will probably take shape in time.

AGRICULTURE AND HORTICULTURE.

[By R. H. Forbes, director of the Arizona Agricultural Experiment Station.]

The agriculture and horticulture of Arizona is, necessarily, of an intensive character. The limited water supply for irrigation, the long growing season, the variety of crops possible, and the excellent home markets, constitute both natural and commercial conditions favorable to diversified farming and maximum production. The irrigable areas are limited only by the scanty water supply, land being far in excess of water. Out of over 72,000,000 acres of the Territorial area, therefore, we find approximately 5,200,000 acres privately owned, of which only about 250,000 acres are actually irrigated. This area is destined to increase as irrigators improve their methods of farming, when storage reservoirs make possible the utilization of flood waters, when reduced cost of pumping makes available the underground supply, and, especially, when the Colorado River is more fully utilized. Along these lines it may be predicted that irrigated lands within the Territory will easily double their present area within a few years.

The grazing industries, also, which are now in large part supported on the public lands, are capable of much needed improvement when legal conditions are such that it shall be possible to so administer the open range that properly regulated use may be made of its resources.

In agriculture, the uncommon variety and amount of marketable produce possible is due to prevailing conditions of soil, irrigation, and climate. The soils of Arizona, as is usual with the soils of arid regions, are rich in most of the elements of fertility, requiring only the ever-needful water, skill, and industry in their management to secure abundant returns. The fertility of cultivated soils in irrigated regions is further assured by the deposit of silt brought upon the land with irrigation water. The problems of fertilization, which become so serious in humid sections, are therefore of much less importance here and not to be so carefully reckoned with in connection with the future of our agriculture. The most marked influence in connection with agriculture and horticulture, especially in southern Arizona, is the climate. From January to June the temperature

resembles that of spring and early summer in the latitude of Kentucky. From June to September the climate is of subtropical fervor, while from September to November there is a second mild season of temperate weather. The winter season, from November to January, though subject to sharp frosts in southern Arizona, is not seriously or even uncomfortably cold.

Owing to this combination of seasons, a remarkable variety of crops may be found in the same locality at different times of the year. Strawberries, which flourish in Greenland, may be found on common ground with the date palm from Sahara. Alfalfa, the great forage of the arid West, flourishes alongside of wheat, corn, and sorghum, respectively, characteristic of Minnesota, Illinois, and Kansas. Oranges, lemons, and olives from California may be found in the same neighborhood with peanuts and sweet potatoes from Virginia. In brief, many of the leading crops of both temperate and subtropical countries, which are not affected by a too arid atmosphere or by the frosts of winter, flourish in southern Arizona. In northern Arizona, where the temperatures more resemble those of northern Illinois, many more distinctively temperate-region crops flourish, such as potatoes, apples, and various small fruits.

The earliness of the season for some crops, such as oranges, melons, tomatoes, apricots, and other export products, is an advantage to the Arizona farmer, while the strong demand for farm supplies in the many mining camps and towns of the Territory maintains a fair average of produce values.

What these values are may be judged by the following figures relating to certain crops grown on the Experiment Station Farm during 1901:

Crop.	Yield per acre.	Gross value per acre.	Cost of producing and marketing per acre.	Net value per acre.
	Pounds.			
Wheat	2,150	$22.55	$10.25	$12.30
Potatoes	3,600	85.00	34.50	50.50
Tomatoes	12,300	225.00	75.00	150.00
Strawberries	5,000	500.00	150.00	350.00
Melons	27,000	140.00	26.00	114.00
Egyptian cotton	400	68.00	48.00	20.00
Corn	1,735	18.00	9.50	8.50

STAPLE CROPS.

Alfalfa.—Probably the most important crop in Arizona is alfalfa. With from four to seven cuttings a year possible, it may be stated that probably in no considerable district within the United States does this plant yield more abundantly.

It has several values in our agriculture. First, as hay, there is a constant market at good prices in the adjoining mining country, prices for baled hay ranging from $7 to $14 a ton. A more profitable disposal for alfalfa, ordinarily, is as a stock fattener. It is so employed in feeding hogs and cattle; also in connection with a thriving dairy industry. It is estimated that about $1,500,000 worth of alfalfa hay and fat cattle, annually, are exported from Salt River Valley. With improved methods of feeding this output can doubtless be greatly increased.

With butter now being shipped into Arizona from Kansas, it is also

evident that there is yet room for the growth of the dairy industry. There are at present three creameries and cheese factories in the Territory, with others in prospect.

Another very important use of alfalfa is as a soil renovator. Our semiarid desert soils are commonly dense, and deficient in humus and nitrogen—circumstances leading to a condition of poor tilth, which often makes successful culture of ordinary crops a difficult matter. Alfalfa, however, flourishes in these soils, and in so doing loosens them to considerable depths by means of its roots, and through its processes of growth and decay contributes the much-desired humus and nitrogen to the soil. In this way alfalfa serves as a preparation for other crops; and it is a matter of common observation that orchards, wheat, sugar beets, and other crops all flourish best on ground which has previously been in alfalfa.

Barley.—From early times barley has been grown in Arizona as a hay crop, being cut and baled for this purpose before maturity. Four to five tons of hay per acre is a fair yield. Certain varieties of beardless and hulless barley recently introduced have advantages over the ordinary bearded. The yield of grain per acre is from 30 to 50 bushels.

Corn.—Although small, quick-growing varieties of corn have long been grown by Indians and Mexicans in the Southwest, it is only within the past few years that fine crops of improved varieties have been grown by American farmers. In order that the grain may properly fill, corn must be planted in July, late enough so that in maturing it may just escape the fall frosts. With the long growing seasons it is possible, water supply permitting, to mature a crop of corn after harvesting a crop of wheat or barley.

Wheat.—Wheat is a leading staple, both as grain and as hay. It is grown as a winter and spring crop, maturing usually before the summer shortage of water occurs.

The chief variety grown is the Sonora wheat of this region, but certain Australian varieties have found favor, and effort is being made to import such new kinds as will make a better milling combination than does Sonora wheat alone. At present much wheat is imported from California by the large flouring mills in Phoenix, Tempe, Tucson, Solomonville, Safford, and Thatcher.

Other grains and forages.—Sorghum has become one of our most important forage crops, not only because of its use for stock-feeding purposes, but because it thrives on land containing considerable alkali. Grown upon such lands, the alkali is partly taken up and removed with the crop, to this extent renovating and improving the soil for other crops. The clubhead is the best and most commonly grown variety in this region.

Kaffir corn approaches sorghum in yield of forage, while Egyptian corn, an excellent drought resister, has proved to be a very promising source of grain. Cowpeas, oats, and rye may be grown experimentally, but are of minor value in this region.

ROOT CROPS.

Many of the important root crops thrive in Arizona. The common potato grows wild at higher altitudes within the Territory. In northern valleys heavy crops are grown by irrigation. In southern

Arizona two crops may be grown, the principal one being planted in February and a less satisfactory one in August. Early Rose, Burpee's Extra Early, Early Andes, Bovee, and Triumph all do well, and from 4,000 to 5,000 pounds per acre is an ordinary crop.

Sweet potatoes and yams produce well in suitable soil, a specimen of the latter weighing 36¾ pounds, from the Upper Gila, being on record.

Field beets, carrots, parsnips, peanuts, radishes, and turnips are all grown with success.

SUGAR BEETS.

During the past five years the Arizona Experiment Station has devoted much time to the investigation of sugar beets, demonstrating the proper methods of agriculture, the productiveness, and the quality of this crop in the Territory. In continuation of this work the Eastern Sugar Company, through Mr. John Johnson, has cultivated a number of plots of beets in Salt River Valley during the spring of 1902, ostensibly with the intention of establishing a beet-sugar factory. The station cooperated by analyzing samples for the company, the following being the more important results obtained:

Plot.	Variety.	When planted.	When harvested.	Sugar in beets.	Purity.	Yield per acre.
				Per cent.	*Per cent.*	*Tons.*
1	Kleinwanzlebener	Jan. 22	June 19	15.3	74.6	14.5
2	.....do	...do	...do	16.0	84.3	14.6
3	.....do	Jan. 23	July 1	15.9	81.3	20.2
4	.....do	Jan. 14	June 30	14.2	83.4	20.9
5	.....do	Jan. 28	July 7	17.6	85.7	16.7
6	.....do	Jan. 25	June 23	13.7	77.8	23.8
7	.....do	Jan. 9	July 7	15.3	81.4	29.0
8	.....do	...do	...do	12.1	76.7	42.7
9	.....do	Jan. 27	...do	18.6	83.8	14.1
10	.....do	Jan. 22	June 24	16.1	83.5	12.1
11	.....do	Feb. 5	July 1	16.6	81.2	15.2
12	.....do	Jan. 28	July 15	17.2	82.2	17.2
13	.....do	Feb. 3	...do	17.3	85.5	23.3
14	.....do	Feb. 13	June 24	15.4	85.3	9.9
15	.....do	Mar. 3	July 22	16.5	86.1	15.8
16	.....do	Mar. 5	...do	14.1	75.9	16.7
17	.....do	Feb. 22	...do	15.3	80.1	23.5
18	.....do	Feb. 14	July 8	14.7	81.2	21.2
	Averages			15.7	81.7	19.5
	Average of 17 samples grown in vicinity of Pima and Safford, Ariz., 1901			12.7	81.9	18.6

These figures justify the statement, previously made, that a satisfactory yield of beets of medium, and sometimes excellent, quality can be grown in southern Arizona, the precautions of early planting, suitable soil, and careful cultivation and irrigation being taken.

VEGETABLES.

Green vegetables in unusual variety may be produced if proper attention is paid to the planting seasons. As mentioned above, there are two mild, temperate seasons in southern Arizona—one extending from January to June, the other from September well into November. Certain of the more quickly growing vegetables, therefore, may be made to produce both in the spring and fall, this double season being recognized by the more experienced residents of this section. Asparagus, beans, cabbage, cauliflower, celery, table corn, cucumbers, egg-

plant, lettuce, melons, peas, spinach, squashes, tomatoes, and other varieties of vegetables in yearly increasing number are successfully grown.

FRUITS.

In northern Arizona, and in certain of the higher valleys where the climate is temperate in character, apples, cherries, pears, and peaches of excellent quality are grown, but only in small quantities, since the irrigated areas are small. Apricots, grapes, and raisins are shipped in considerable amount from Salt River Valley. Oranges and lemons of superior quality are produced in Salt River Valley and near Yuma. They have the commercial advantage of a season earlier than that of southern California, while, in addition, the fruit is uncommonly bright and attractive in appearance. This is due to the fact that the scale insects perish from the effects of the dry, hot atmosphere, leaving the fruit unmarred by their presence. Strawberries in skillful hands are a very profitable crop in southern Arizona, the entire product being marketed in the Territory. Figs grow luxuriently in southern Arizona, but require a constant and abundant supply of water in order to yield well. Almonds have been grown with varying success. The great drawback to their culture is the late spring frosts, which are so likely to destroy the crop. For the past four years, however, the growers have in most instances succeeded in warding off the disastrous frosts by smudging their orchards at critical times. During this time heavy crops of the highest market value have been secured, especially in the vicinity of Mesa City.

Olives are a promising crop in southern Arizona. This tree requires comparatively little water, and the scale, which is so abundant upon the tree in California, is not found upon it here. Experts state that the trees grown in Arizona are unusually bright and attractive in appearance and their fruit of good quality. The product of the olive tree, also, either in the form of pickles or oil, may be held for the best market, and is of small weight and bulk in comparison with its value, shipping charges being thus economized. It is not improbable that this fruit has a growing future in this region, since the demand for olive products is at present throughout the United States far in excess of the supply.

THE DATE PALM.

Experimental work with the date palm has steadily progressed during the year. Although large groves of these trees are found here and there throughout Sonora, many individuals having an age of 200 years or more, and although their product is a popular article of food with the Mexicans of this region, no systematic attempt has before been made on the Western Hemisphere to develop the full value of this useful tree.

The product is not only a palatable fruit, now mostly used as a luxury, but is an excellent food, especially suitable for hot climates. As a food, the date is the chief dependence of men, horses, and camels in the desert regions of Africa and Arabia, and its use as a staple in the United States is capable of indefinite increase. The annual importation of dates into the United States now amounts to about $400,000 in value, being an incentive to the establishment of a new industry which,

for climatic reasons, can only be developed in the hot, irrigated valleys of the semiarid Southwest.

The experimental date orchard, 3 miles south of Tempe, has prospered during the year, two large shipments from Egypt, Arabia, and Beluchistan having been received and planted. Eleven acres of palms are now in the ground, comprising 85 imported varieties and about 600 trees.

The large shipment brought from Algiers in July, 1900, has done surprisingly well in the new orchard, and at the present time (August, 1902) no less than seventeen of the transplants are bearing small bunches of fruit. It will be several years before the best varieties for this country may be finally determined, but there is little doubt that in time this experimental work will result in the establishment of a new agricultural resource in the Southwest.

MISCELLANEOUS PRODUCTS.

Bees produce an abundance of excellent honey in this region, depending in part upon alfalfa and in part upon the inflorescence of the mesquite, various acacias, and other wild vegetation. The Salt River and Gila valleys are stated to have produced $80,000 worth of honey in the season of 1899, largely shipped in carload lots to Eastern points.

Tobacco may be grown under irrigation, but its culture has not as yet received expert attention. Much of the native product is worked up by local manufacturers, chiefly for the Mexican trade.

Experimental work with Egyptian cotton, a valuable Old World long-staple variety, indicates that it produces excellent fiber here, but its commercial success is yet to be demonstrated.

In general, it may be stated that the combination of temperate and subtropical characters in the climate of this region, together with the intensive methods consequent upon irrigation, have combined to make possible an extraordinary variety of agricultural productions, for which there exists a ready market in the surrounding mining districts. These facts, when coupled with the experience necessary for success in a new region, combine to afford better than average returns to the Arizona farmer.

THE AGRICULTURAL EXPERIMENT STATION.

In a new country, rapidly filling up with settlers from regions of a different agricultural character, an agricultural experiment station may make itself useful to an unusual degree. The problems presented to the newly arrived Southwestern irrigator are largely foreign to his experience and difficult of solution. Reliable information, therefore, relating to soils, irrigating waters, crops, live stock, methods of farming, etc., are demanded and appreciated by our farmers.

The Arizona station is so organized and its work so distributed as to render all possible service to the various phases of agriculture in the Territory. The administrative office and the scientific laboratories are located in the university main building at Tucson. The range reserve for the study of grazing conditions is suitably situated 6 miles southeast of the offices. The station farm, where agricultural, horticultural, and stock-feeding work is carried on, is situated near Phoenix, in the midst of the largest farming district in the Territory. The date

orchard is 3 miles south of Tempe, Ariz., in an alkaline district for which it is desired to demonstrate a profitable branch of horticulture.

The available publications of the station touch upon a wide variety of farming topics, and may be had upon request from the experiment station, Tucson, Ariz.

PUBLIC BUILDINGS.

During the year the Reform School for Juvenile Offenders, located at Benson, has been added to the public buildings of Arizona. The cost of this building is but $28,600, and for that amount of money one of the most substantial and imposing structures to be found in the Territory has been built. Additions to the building as it now stands will be made during the present year, embracing mainly improvements about the building. The reform school is 120 feet in length and 54 feet 6 inches in depth, being two stories in height, with a basement 50 by 35 feet under each of the two wings of the building. White tufa stone is used throughout the building, and the inside facing is of brick. A complete description of the building is presented in this report under the head of "Reform school for juvenile offenders."

The public buildings of Arizona are the capitol, located at Phoenix; the University of Arizona, at Tucson; the Territorial prison, at Yuma; the asylum for the insane, at Phoenix; the Northern Arizona Normal School, at Flagstaff; and the Tempe Normal School, at Tempe; and the reform school for juvenile offenders, at Benson.

The capitol building, constructed at a cost of about $130,000, is one of the finest public buildings possessed by any Territory, and would be a credit to many wealthy States. The building is 184 by 84 feet, and four stories in height. Accommodations are provided in the building for the various Territorial officials, the legislature, and the surveyor-general. The capitol grounds are extensive, comprising 10 acres, the capitol building commanding a central location and facing the main street of the city of Phoenix, which leads to the capitol grounds. The grounds are well cared for, and contain numbers of deciduous trees, palms, roses, shrubs, and cactuses.

The rotunda of the capitol is 44 feet in diameter and extends from the ground floor through all the stories of the building to a height of 78 feet, being surmounted by a dome which is crowned by a statue of Liberty 16 feet in height. The dimensions of the halls provided for the legislative bodies are 38 by 36 feet, and special attention has been given to the acoustic properties of these halls and to their ventilation. The gallery space in each hall has a seating capacity of between 200 and 300, and in the surrounding halls are the committee and other rooms required for the accommodation of the assembly. Spacious offices are also provided for the governor and other Territorial officers.

The Territorial prison buildings are inclosed with a wall, the front and rear lengths of which are 290 feet, the sides being 321 feet long. This does not include the woman's department at the southwest corner, which is about 30 by 30 feet. The walls are 20 feet high, 8 feet thick at the bottom and 5 feet at the top, which is surmounted by a cement cap and coping. Inside of the walls is the cell house, 134 feet long by 65 feet, built of rock and iron. A building of adobe, 167 feet long by 34 feet in width, contains the engine room, boiler room, tailor and shoe shops, laundry and bath house, and library; and the kitchen

and dining-room building is also of adobe, 110 by 21 feet. The dining room is 75 feet long and 18 feet wide inside. Outside the walls are the office of the superintendent—the same building, one story in height and 38 by 38 feet in size, being also used as a storehouse—and a two-story building for the sleeping accommodations of the guards.

The insane asylum consists of a main central building of brick, two wings of two stories, and basements. The main building is 100 feet long and 50 feet wide. A hall of 12 feet in width runs the entire length of the building. On each side of the central structure there is a wing 100 feet long and 40 feet in width, separated from the main building by a vestibule 16 feet wide. The outbuildings consist of a general dining room, 100 feet by 40 feet, with two wings each 16 by 20 feet. A building containing the engines, boilers, dynamos, and pumping plant, and the stables, carpenter shop, blacksmith and paint shops comprise the other buildings of importance. The ornamental grounds in front of the asylum contain 4 acres, tastefully stocked with trees, semitropical flowers, plants, and palms. The asylum is situated 2 miles east of the business section of Phoenix.

The normal-school building at Tempe is a commodious structure 136 feet long, 80 feet wide, and three stories high. The lower story is of brown sandstone, and the other two of pressed brick with sandstone trimmings. This edifice is beautiful in architectural design, convenient in arrangement, and substantial in construction. All things considered, the building is excellently equipped for the purposes of normal-school work.

The Northern Arizona Normal School is located at Flagstaff, in Coconino County, and is an important addition to the educational system of the Territory. The building is of stone, commodious, and convenient in its appointments. It is the finest public building in Arizona so far constructed, except the capitol.

A description of the university will be found under the head of "Education."

LABOR SUPPLY.

The labor supply in Arizona is almost always equal to the demand, although when extensive railway building is begun labor is frequently imported from adjoining States and Territories and from Mexico. Skilled labor employed in the mines is easily secured, owing to the constantly diminishing and increasing operations in the various mining regions, miners finding employment readily at new camps when they are thrown out of employment by the diminishing of the forces where they have been employed. Extensive railway building during the year has drawn large numbers of laborers to Cochise County from Texas and Mexico.

Labor is organized in most all of its branches, and during the year a Territorial organization, embodying all of the labor organizations, has been perfected.

The trades are represented by intelligent, skilled, and industrious men, and there have been but few instances in the history of Arizona where trouble has arisen between employer and employee.

Good wages are paid in all branches of trade, and contentment and peace prevail among laborers and employers.

THE PRESS.

The newspapers and other publications in Arizona are of a high class, conducted upon broad and liberal ideas for the betterment of the Territory and the communities in which they are published. The expression of opinions upon all matters of national, Territorial, and local importance is intelligent and forceful, and the influence of the press is recognized in the upbuilding of communities, the strengthening of public opinion upon all questions of material interest, and in the moral and social advancement of the people.

The various daily and weekly publications in the Territory are given as follows: The Arizona Star, Tucson (d.); The Tucson Citizen, Tucson (d.); The Tucson Post, Tucson (w.); Alianza, Tucson (w.); El Fronterizo, Tucson (w.); The Arizona Silver Belt, Globe (w.); The Globe Times, Globe (w.); The Pima Paragon, Pima (w.); The Safford Guardian, Safford (w.); Solomonville Bulletin, Solomonville (w.); Clifton Era, Clifton (w.); Morenci Standard, Morenci (w.); The Oasis, Nogales (w.); The Border Vidette, Nogales (w.); Tombstone Prospector, Tombstone (d.); Bisbee Review, Bisbee (d.); Bisbee Miner, Bisbee (d.); Douglas Dispatch, Douglas (w.); Douglas International, Douglas (w.); The University, Tucson and New York (m.); University Monthly, Tucson (m.); Native American, Phoenix (w.); Holbrook Argus, Holbrook (w.); Winslow Mail, Winslow (w.); St. Johns Herald, St. Johns (w.); Snips, St. Johns (w.); Coconino Sun, Flagstaff (w.); Williams News, Williams (w.); Mohave Miner, Kingman (w.); Our Mineral Wealth, Kingman (w.); The Arizona Arrow, Chloride (w.); Prescott Courier, Prescott (d.); Arizona Journal-Miner, Prescott (d.); The Prospect, Prescott (w.); Jerome Mining News, Jerome (w.); Jerome Reporter, Jerome (w.); Wickenburg News-Herald, Wickenburg (w.); The Arizona Republican, Phoenix (d.); The Arizona Democrat, Phoenix (d.); The Arizona Gazette, Phoenix (d.); The Phoenix Enterprise, Phoenix (d.); Southwestern Stockman, Tucson (w.); Saturday Review, Phoenix (w).; The Arizona and New Mexico Workman, Phoenix (m.); El Mensajero, Phoenix (w.); Tempe News, Tempe (d.); Mesa Free Press, Mesa (w.); Yuma Sun, Yuma (w.); The Arizona Sentinel, Yuma (w.); The Florence Blade, Florence (w.); Range News, Willcox, (w.); Press, Benson (w.).

STATEHOOD.

Arizona has passed through all of the various stages of Territorial growth, and to-day the magnificent development of its resources places the Territory so far advanced that to longer deny the star of Arizona a place upon the flag of our country is regarded here and abroad as an injustice to the people who have so faithfully borne the burden of a Territorial form of government for a period of thirty-eight years. The preparation in all that is required of a Territory—in population, in developed resources, in productiveness, in advanced social conditions, and in patriotism and loyalty to the country and humanity, has reached the highest aim of a great commonwealth.

During the past year the issue of statehood has been uppermost in the minds of the people of this Territory. The subject has been thoroughly studied and discussed by the citizens of every county

within the borders of Arizona, and from every quarter comes a most urgent appeal for the realization during the coming session of Congress of a desire which is strong in the breast of every citizen of the Territory, the privilege of full and complete sovereignty.

In the city of Phoenix, on October 26, 1901, there was held a Territorial statehood convention, which was attended by delegations of citizens from every county in the Territory. The interest in the statehood movement had reached a high point, and a demand for a public expression of the desires of the people culminated in the great gathering at Phoenix. Leading citizens of Arizona participated in the deliberations of this convention, wise counsel was held, and able argument presented which brought forth substantial facts to show that Arizona was being denied a place in the sisterhood of States which justly belonged to her and which all of the advanced conditions of her development demanded and upon which the greatest achievements of her future depended.

This convention sent a delegation of substantial citizens to Washington to give personal attention to the interests of Arizona in her demand for statehood. The committee worked diligently, using every honorable means to forward the claims of the Territory, spreading the knowledge of its resources among Senators and Congressmen, presenting facts which convinced, and never once failing in an earnest appeal for early and decisive action. The Board of Trade of Phoenix sent a representative citizen to Washington to assist this committee, and altogether the subject of statehood was brought to the attention of Congress, and an enabling act admitting Arizona, Oklahoma, and New Mexico was passed by that body. The action of the Senate upon the bill was withheld until the December session, when the bill will come up for consideration and final action.

The resolutions passed by the Territorial statehood convention are presented herewith, to show the argument which Arizona makes for admission as a State:

Resolved, That we, the people of Arizona in convention assembled, hereby declare that we are justly entitled to be freed from a Territorial form of government; that such a government is fitted only for a sparsely settled and turbulent frontier, and that whenever any section of country becomes reasonably developed by a sufficient number of people, wealth, and intelligence, such country should then be erected into a sovereign State and the people thereof clothed with full powers of self-government. It has been the unvarying custom of the people of the United States, through Congress and the Executive Departments, to admit to the union of States every Territory which possessed sufficient population, wealth, and the ability to govern itself.

We also declare that the Territory of Arizona has been under a Territorial form of government for a period of thirty-eight years; that for the past ten years she has had a larger population and greater wealth than the average of all the States of the Union at the time of their admission since the original thirteen States established the Government.

The Territory of Arizona, in point of climate, soil, and mineral resources, is without a peer. No other equal area west of the Mississippi River has more natural resources. Her soil produces the oranges and limes of Italy, the dates of Egypt, the grapes of France, the cereals of the North, and the cattle and sheep of the Central States; her mineral wealth is unmeasured; her mines of copper alone are producing bullion of the value of $35,000,000 annually.

We declare that Arizona is justly entitled to admission as a State: First, because she has the requisite number of people; second, because she has more than the requisite amount of wealth; third, because she has the ability and desire for self-government; fourth, because her people have shown themselves to be first in patriotism and loyalty to the Union in time of peril; and finally, the admission of Arizona to statehood will, in addition to our already acquired population and wealth, cause a

rapid increase in development through the confidence inspired by the knowledge of stability under State law.

Resolved further, That confidently relying upon the sense of justice and liberality existing in both branches of Congress, we do most earnestly and respectfully entreat and petition the United States Congress to pass an act enabling Arizona to take her proper place in the sisterhood of States.

J. M. FORD,
Chairman of Committee on Resolutions.

RECOMMENDATIONS.

1. That Arizona's claims to statehood be given due consideration, and that such aid as lies within the power of the Interior Department be extended to secure the passage of the enabling act now before the Congress of the United States for the admission of Arizona, New Mexico, and Oklahoma to the sisterhood of States.

2. That under the Newlands-Hansbrough Act the claims of Arizona for Government aid in irrigation be fairly and carefully considered and the same extended, to the end that within the limits of this Territory there shall be inaugurated the first of those great systems eventually to come from the application of this law.

3. That the salary of the governor of Arizona be increased to a sum commensurate with the duties required of him, or at least that the sum allowed by law as his salary shall be appropriated by the Congress.

4. That the Indian school facilities in Arizona be increased, in order to more quickly prepare the younger generation to become self-supporting.

5. That the appropriation for the National Guard of Arizona be increased.

6. That the appropriation for the contingent expense of the governor's office be increased sufficiently to provide additional clerical force.

7. That upon the admission of Arizona to statehood there be set apart, for the establishment and maintenance of a hospital for the aged and infirm miners, 150,000 acres of land from the public domain.

8. That an appropriation be made for the improvement of the Colorado River, and the construction of a levee from the town of Yuma to the Mexican line, to prevent the overflow of cultivated land by the annual freshets.

9. That appropriations be made for the purchase of sites and the erection of public buildings in cities in this Territory when the same can be shown to be of ultimate benefit to the General Government.

10. That appropriate measures be taken by the Interior Department looking to the rejuvenation of the depleted forest area in this Territory, and that a system of tree and tree-seed planting be inaugurated by the Division of Forestry.

Very respectfully, your obedient servant,

ALEXANDER O. BRODIE,
Governor of Arizona.

Hon. E. A. HITCHCOCK,
Secretary of the Interior,
Washington, D. C.

APPENDIX.

In order to present accurate information in regard to the progress made in the different counties of Arizona during the fiscal year ended June 30, 1902, I have the honor to submit herewith statements under the heads of the various counties, which will show the population, financial condition, and industrial advancement. The reports have been prepared in the main by the clerks of the boards of supervisors of the respective counties, and are exhaustive and complete.

APACHE COUNTY.

Population.—The population of Apache County is rapidly increasing, but during the past year the growth has been more rapid, the increase being estimated at 1,000, which gives the county a population to-day of nearly 10,000. The increase is due, in the main, to the settlement of agricultural lands within the county, as is shown from the statement following, under the head of "Settlement of lands."

Taxable property—The taxable property of Apache County, with the increased valuation added by the board of equalization, is $870,747.57.

Financial condition.—Apache County is among the first counties of Arizona in wealth. There are no county warrants outstanding, and the county may be said to be on a strictly cash basis. The financial condition is summed up as follows:

LIABILITIES.

7 per cent bonds outstanding, due in 1907	$10,000.00
Territorial 5 per cent funding bonds	43,439.86
Total debt	53,439.86

RESOURCES.

Cash in treasury July 1, 1902	$10,000.00
Court-house and grounds, St. Johns	5,000.00
Safes and furniture	4,000.00
Jail building, St. Johns	10,000.00
Steel cells and furniture	4,000.00
Bridges and other property	2,000.00
Total resources	35,000.00

Settlements of lands.—Wonderful improvement has taken place in this county during the past twelve months. From an accurate and reliable source I learn that 5,000 acres of land have been reclaimed during the period above stated. All of these acres are not under cultivation, but every one of them is susceptible of cultivation, as the estimate is based on reservoir capacity, and the reservoirs are already

completed. Apache County should well feel proud of the progress thus exhibited by her citizens.

Development of water.—There are now completed in the county ten large reservoirs, which, when full, will contain sufficient water to irrigate 100,000 acres of land. The largest one in the county is situated about seven miles south of St. Johns, on and across the Little Colorado River, which is owned and controlled by the St. Johns Irrigation Company, a corporation composed of residents of St. Johns and vicinity. This reservoir, when full, will contain sufficient water to irrigate 25,000 acres. All in all, this county is rapidly forging ahead. The people realize the value of the natural resources so abundantly spread around them and are utilizing them. Ere many years undeveloped land will be as scarce in Apache County as it is in Kansas.

Irrigation.—The prime necessity within Apache County for the past decade—a necessity being yearly more urgent—lies in the inadequacy of the water supply for irrigation, as compared with the number of fertile acres lying unirrigated and unproductive. The remedy lies in water storage, and, as stated under the head of "development of water," Apache County is well equipped with reservoirs to impound all the flood waters of the Little Colorado, but owing to the succession of droughts they have been unable to fill the reservoirs now constructed, which could bring under cultivation at least 100,000 acres of as productive land as can be found anywhere in the world.

All that is required is sufficient snowfall in winter and rains in summer to insure success, as all of the flood waters of the Little Colorado River can be impounded in the reservoirs now constructed.

A corporation has been organized in St. Johns for the purpose of sinking for artesian water and also to sink wells for stock purposes. The required machinery will soon be on the grounds. By this method thousands of acres of good grazing land will be made available for the pasturing of stock.

Railroad building.—A preliminary survey has been made for a railroad from Durango, Colo., to Clifton, Ariz.; the line will be about 350 miles long. This line, when completed, will be of great benefit to the people of Apache County, as it will mean cheaper rates for all commodities that the people have to import. Work on this road will be commenced some time during the fall and pushed to completion as soon as possible.

Stock raising.—This is the chief industry in the county. The following is a list of stock and valuation: 3,000 horses, value $40,000; 4,000 cattle, value $60,000; 100,000 sheep, value $200,000.

Cattle, sheep, and horses are of the improved breed, and progress is continually made in this direction.

The development of the artesian water supply and the erection of surface wells and windmills, the condition for which seems most favorable, will render the whole extent of the grazing land in this county available.

Sheep ranching, on the whole, since the election of President McKinley and the passage of the "Dingley bill," has been more satisfactory than that of cattle. Many owners have sold their cattle and reinvested in sheep. In addition to its having been more profitable, the nature of the business is felt to be more secure, from the fact that the herder being always kept with the flock, counting them every morning as they go from the field, there is practically no loss from

straying and none from theft, and losses from drought and overstocking are avoided. No portion of the United States surpasses Apache County as a sheep-raising country. The conditions of feed and climate are exactly suited to their highest development.

Forests.—The White Mountains are covered with a heavy growth of tall, stately pines, varying in diameter from saplings to 4 feet. Very little timber has been cut from these forests, and that only for near-by use. In timber alone this county is worth many millions of dollars, all idle, awaiting the advent of capital.

Undeveloped resources.—Coal has been found in abundance, but it has not been sufficiently prospected to determine the extent and quality. Among enterprises that could be engaged in and made profitable I would mention woolen mills, tanneries, and the production of lime and cement. The county has every facility for carrying on the above and insures in the investment a profitable business.

The above report of the condition of Apache County was submitted by Mr. Monico Garcia, clerk of the board of supervisors of that county.

COCONINO COUNTY.

Population.—Reports from Coconino County do not indicate that there has been an increase in the population during the past year, owing to the fact that many stockmen and others have left the county and there is scarcely any land upon which settlement can be made, all available lands being held in reserve by the Government.

Irrigation.—There is but little irrigation carried on in this county, owing to the scarcity of water. No extensive development of water has been attempted. There are at the present time no more than 15 ranches in Coconino County.

At Lees Ferry water is obtained from springs in the Parish Canyon. The supply is more than sufficient for the small area under cultivation, and the crops irrigated are alfalfa, grapes, apples, and peaches. At Tuba water is supplied from Moen Copie wash. There is a slight scarcity in July that could be prevented by small reservoirs along the line of ditch. The Indians at Supai obtain water from Cataract River, which comes out of the ground in torrents at the head of their camp. The flow is so great that the amount used for irrigation is hardly noticeable. Evidences abound showing that the Indians practiced irrigation hundreds of years ago. The Fredonia ditch receives its waters from Kanab Creek. Owing to the great width and sandy nature of the creek bed, the flow is very irregular. The winds drive the shifting sands across the stream, causing the water to spread over a large area, where it soon evaporates.

Stock raising.—This industry has suffered considerable owing to restrictions of forest-reserve acts and lack of snow and rain. Sheep raising is profitably carried on in the county and great quantities of wool produced each year.

Lumber.—The lumber industry is prominent in Coconino County, large lumber mills being located at Flagstaff and Williams. An unlimited supply of timber is secured from the forests of the county. A statement of the lumber industry may be found under the subject of forests and lumber in this report.

Area.—Coconino is the largest county in the Territory and includes

within its boundaries parts of the Moqui, Navaho, Hualpai, and all the Supai Indian reservations, the last named being situated in the Grand Canyon Reserve. The greatest length of the county is 185 miles, its greatest width 140 miles, and its area is nearly 19,322 square miles, being larger than the combined areas of Vermont, Massachusetts, and Delaware. It is on the great Colorado plateau and the greatest portion has an elevation of nearly 7,000 feet. Across the northern part the county is traversed by the Colorado and its tributary, the Little Colorado. These rivers have cut steep walled canyons thousands of feet in depth, abounding in wildly picturesque scenery and wonderful gorges. Though carrying a large volume the rivers are useless for irrigation, as the waters are hundreds or even thousands of feet below the surface of the arable land. Owing to this lack of an available water supply, the area irrigated is small and is confined to the localities of Lees Ferry, Tuba, Supai, and Fredonia.

COCHISE COUNTY.

Population.—The mining industry of this county has increased the population considerable since the census of 1900, which gave Cochise County 9,251. Bisbee, the great copper camp of the Phelps-Dodge Company, has steadily increased in population, and is to-day one of the largest cities in Arizona. Douglas, a new town located on the international border line, contains about 1,500 people, and is fast growing in importance as a commercial center, and the home of smelting and mining industries. Naco has also expanded during the year, and Tombstone, once the largest mining camp in the Southwest, is again taking an important place as a point of activity and development. Pearce, Willcox, Gleeson, Black Diamond, Benson, Fairbank, and many other towns have shown progress. It is safe to estimate that the population of Cochise County this year is 15,000 or over.

Taxable property.—The abstract of the taxable property of Cochise County for the present year shows $4,040,303.77.

Bonded indebtedness.—The bonded indebtedness of the county is $118,000.

Irrigation and ranching.—The Mormon settlers of the San Pedro Valley carry on extensive farming, and with their great energy and push have succeeded in making some most substantial farms, which yearly give them profitable returns. A large number of wells have been sunk upon these ranches at St. David and other places south of Benson, and water thus obtained for irrigation is spread over large areas of fertile bottom lands. Benson, Fairbank, Tombstone, and other points provide markets for the products, and great quantities of hay and grain are shipped to the larger markets. In the San Simon Valley artesian water was developed first in 1882, and a number of wells are successfully operated for supplying water for irrigation. The San Simon River also supplies some small ranches with water for farming. Some irrigation is carried on in the Sulphur Springs Valley by using water from the White River. Near Fort Huachuca ranchers take water from Babacomari Creek and from springs in the Huachuca Mountains and use it for small farming and domestic use. The St. David and Union ditches in the San Pedro Valley are the chief sources of extensive irrigation in the county.

Stock raising.—Cochise County is one of the principal stock-raising

counties of Arizona. Great areas of fine ranges provide feed for stock throughout the more favorable years, and thousands of cattle and horses roam the ranges of this county. Cattle raising is carried on extensively by individuals and large corporations, and there are some of the largest ranches to be found in this county of any section of Arizona. It is regarded as one of the most favorable portions of Arizona for stock, and the industry is in a prosperous condition considering the extent of the drought of the past few years.

Mining.—Cochise County is the banner mining county of Arizona. The development during the past year has been remarkable in many respects, and immense undertakings are now in progress which will double the population of the county within a few years. The large mines of this county are mentioned under the subject of general mining development in the preceding pages of this report.

Railways.—The construction of a branch of the El Paso and South western Railway has begun at Fairbank, and the road will be built to Tombstone and on to connect with the main line at College Peak. This branch will be of great advantage to Tombstone, Gleeson, and other frontier mining camps, and will be the means of developing a rich mineral portion of Cochise County. During the year the main line of the El Paso and Southwestern Railway was built into Bisbee and Douglas, and a branch road was built from Naco to La Cananea, Sonora, Mexico, thus giving an outlet into Mexico of the products of Cochise County ranches.

GILA COUNTY.

Population.—This county has enjoyed substantial growth during the year, principally in the mining centers. The drought has caused some annoyance to the cattlemen, and has had a tendency to lessen the interest in the stock industry, which has always been prominent in the industrial prosperity of the county. Globe, the county seat and the chief city, has grown to a considerable extent and is regarded as one of the most substantial mining camps in the Southwest. The population, natural in all mining camps, is more or less floating, although the camp maintains about the same number throughout the year, new men always coming to take the place of those who go away. Globe draws far into the mountains and valley regions for its trade, and is not wholly dependent upon the mines.

Irrigation.—Owing to the mountainous nature of the county irrigation is carried on in a small way. In the Tonto basin there are over 1,500 acres of land under cultivation, water being secured by ditches which carry it from Tonto Creek. The supply is abundant only after rain storms. The valley contains fertile agricultural lands, and might become very productive with the construction of reservoirs for storing water, there being excellent sites for the same. Some irrigation is practiced on Pinal Creek, the bench lands, and the small area of the valley through which the creek flows, providing excellent agricultural lands. At Kenton a number of farmers own a ditch, but for the most part the ditches are owned by the individual rancher.

Stock raising.—Throughout the county stock raising is carried on in all of its branches. Cattle, horses, and sheep are raised for the market. The shipments of cattle are always very heavy from Gila County, the

ranges providing feed for large numbers of cattle during favorable years. Gila is one of the leading stock counties of Arizona.

Undeveloped resources.—Gila County has numerous undeveloped resources, among them the development of water and the construction of reservoirs. The markets provided for agricultural products are excellent, and large agricultural operations would become very profitable.

Mining.—This is the chief industry of the county, and a comprehensive statement of the large operations now being carried on will be found under the subject of mining in this report.

Financial conditions.—Total indebtedness of the county, including bonds of every class, $51,000. Increase of taxable property for the year 1902 over the previous year is $260,759.61.

Gila River and San Carlos dam site.—This river rises in southwestern New Mexico and has a general southwesternly direction until it crosses the Territorial line into Arizona at about 32° 40′ north latitude. Its principal sources of supply are from the Black Range on the east, and from a number of ranges on the west, including Little Range, Mogollon Range, and Diablo Range. The average elevation of these mountain peaks is from 9,000 to 10,000 feet. The general character of the country is a high and rolling plateau, with the river flowing through it in a deep canyon, and with practically no agricultural lands within its area. The river emerges from its upper canyon about 10 miles before it reaches the Arizona line, and thence flows through a valley of considerable width, known as Duncan Valley, until just before it receives the waters of San Francisco River. In Duncan Valley a number of ditches divert water for irrigation purposes. San Francisco River, the principal tributary of the upper Gila, has its source in the northeast corner of Graham County, Ariz., but 15 miles below it passes into New Mexico. Its general course is thence southerly, returning into Arizona at about 33° north latitude. The area drained is high and mountainous, the principal ranges being the San Francisco, the Tularosa, and the western slope of the Mogollon, with elevations ranging from 8,000 to 10,000 feet. The course of the river through this portion is characterized by a succession of canyons alternating with valley-like openings, with a fall of about 35 to 40 feet per mile.

Gila River is in a canyon for about 20 miles below the mouth of the San Francisco, or to within 10 miles of Solomonville. At this point the hills separate, forming a large valley which has been extensively settled and is now one of the finest irrigated portions of the Territory. This valley extends from a point 10 miles above Solomonville to 6 miles below the mouth of the San Carlos River on the White Mountain Indian Reservation. At this latter place the mountains suddenly close in again, and the river enters upon another canyon. Seven miles below the Indian agency at San Carlos the canyon boxes to a width of 100 feet, and at this point is located the San Carlos dam site, which was studied in detail by the United States Geological Survey during 1899, in connection with the investigation of the water supply of Gila River.

The San Carlos reservoir site is located on the White Mountain Indian Reservation, at the San Carlos agency. The Gila Valley, Globe and Northern Railway, which leaves the main line of the Southern Pacific at Bowie Station and runs to the town of Globe, passes across this reservoir site. A dam at this point, 130 feet high to the spillway, will

impound 241,396 acre-feet, while a dam 150 feet to the spillway would impound 377,176 acre-feet.

GRAHAM COUNTY.

Population.—Owing to the steady growth of the mining camps of Clifton, Morenci, and other centers of mining activity, Graham County each year shows an increase in population. As the mining and agricultural operations expand the county's taxable wealth increases, and the close of the fiscal year of 1902 finds Graham County wonderfully advanced in every line of industry. The population, as given by the census of 1900, gives this county 14,162, and the year following the increase was very great. It is estimated that the increase during the last year in population of this county was 1,200. The opening of the Shannon mine and other important camps has provided places for hundreds of men, who, for the most part, have been drawn from the mining regions of the States. The mining development has been substantial and unusually active during the year, bringing to the county many from Eastern money centers and Western mining regions to swell the population of the county.

Taxable property.—From a report submitted by Mr. Thomas Smith, clerk of the board of supervisors of Graham County, I take the figures given below, which show the condition of the county financially at the close of the fiscal year ended June 30, 1902. The taxable property is given as $3,388,234.67, showing an increase over the preceding year of $441,498.15; the resources of the county are $43,557.46; the liabilities are $23,193.85, thus leaving a balance of $20,363.61 in favor of the county; bonded indebtedness, $182,364.70; floating indebtedness, $15,980.94.

Settlement of lands.—During the year fifteen land claims, comprising 2,400 acres, were settled upon in the county.

Progress.—The change of gauge from 3 feet to standard gauge of the Arizona and New Mexico Railway increased the taxable property of the county $117,994.25; agricultural development, lands, and improvements increased $245,460.71; mining increased $39,032.66; and all other resources not mentioned increased $58,824.25. The above figures show the rapid and substantial growth made by the county during the past year.

Stock raising.—There was a decrease in the stock-raising industry amounting to $19,813.72, owing chiefly to cattle being removed from the county.

Education.—One high school and two new school districts were created during the year. The schools of the county are in excellent condition and the attendance is very large.

Mining.—The advancement of Clifton, Morenci, the establishment of the Shannon and other mining camps, afford an interesting chapter in the advancement of Graham County's mineral wealth during the year. Contained in the governor's report, under the department of mining, will be found complete descriptions of these great camps and the various mining resources of the county.

Undeveloped resources.—Graham County, like almost every county in Arizona, has an appeal to make for water storage, nature having provided a number of excellent storage basins and thousands of acres of land for irrigation close at hand. The soil of the Gila Valley is

well known as possessing great fertility and the valley lands under irrigation have made great strides during the year in production.

Gold mining is regarded as one of the great undeveloped resources of Graham County. There are many promising districts where gold veins show values on the surface, but their development has been, in the main, very meager. There is constantly a great deal of activity in all of the mining districts of the county, and new discoveries of value are frequently reported.

MOHAVE COUNTY.

Population.—Mohave County has enjoyed a substantial increase in population during the past year. The census of 1900 gave this county 3,433 and the estimated increase up to the present time is 400, thus giving the county a population of 3,833 in 1902. New mining camps have sprung into existence during the year, and mining camps already operating when the census of 1900 was taken have materially increased in population.

Taxable property.—John P. Feeny, clerk of the board of supervisors of Mohave County, submits the following statement of the progress made during the past year:

Financial conditions of the county.—Bonded indebtedness, $105,363.29; floating indebtedness, $23,108.23; total, $128,471.52.

Settlement of lands.—Mohave county shows but little increase over last year in the settlement of lands. There is but little water available at the present time; and the area irrigated in the county is small. Several million acres of land in the county might be reclaimed if reservoirs were constructed in the mountains. The Colorado River might supply water for thousands of acres if some means could be provided for pumping the water onto the uplands contiguous to the river's course through the county. Irrigation, by using the water from the river without pumping, is almost impossible, owing to the depth of the erosion of the river bed.

Development of water.—There has been scarcely any development of water for irrigation purposes during the year. In mining operations water has been developed in several instances sufficient for camp and use in mining operations, and it is apparent that depth in mining seldom fails to provide an abundance of water.

Stock raising.—In all its branches stock raising in Mohave County shows a steady decrease, owing to the extremely light rainfall on the ranges, and scarcity of feed and distance between watering places has caused the decline in this industry; but the conditions will improve with the late summer rains, and the stock interests of the county will no doubt again become important as an industry.

Mining.—This is the chief industry of Mohave County, and during the past year large sums of money have been invested. New mining properties have been developed, and important mining camps appeared in the rich mineral districts of the county. The development has been most substantial and the production of ores and metals has greatly increased during the year of activity. Gold, silver, copper, and lead are produced in quantities, smelting facilities being close at hand for the treatment of the ores. The county is rapidly rising in the mining field, and is recognized as a profitable place for the investment of capital in mines.

Undeveloped resources.—The fact that millions of dollars have been taken from the surface workings of mining properties in Mohave County must be sufficient evidence of the vast wealth of mineral which nature has stored at greater depth. The mining districts are practically undeveloped at the present time, only a few of the most favorable districts having received attention. The great veins bearing gold, copper, silver, and lead have scarcely been prospected, and mining men living in Mohave County predict that when the county's mineral resources are developed it will stand among the first in production of precious metals in Arizona.

Immense tracts of lands within the boundaries of the county might be utilized for agricultural purposes when dams are built in the mountains and reservoirs constructed for storing water. The agricultural possibilities of Mohave County's valleys form one of the most important assurances of future greatness. The soil is productive, the climatic conditions are most favorable, the markets are close at hand, and all that stands in the path of a realization of the development of these resources is a proper supply of water. Not alone in mining, but also in agriculture, Mohave County presents a wealth of undeveloped resources.

Mohave County is the second largest county in Arizona, having an area of 13,421 square miles. The valleys of Hulapai and Sacramento, each having a width averaging 3 miles and being 100 miles long, are fertile and might become very productive with water supplied from reservoirs. The principal irrigated sections, however, are confined to tracts along the Big Sandy River and the Rio Virgin, and small patches of ranch land which are supplied with water from springs and wells.

MARICOPA COUNTY.

Population.—During the past year there has been considerable increase in the population of this county. The census of 1900 gave the county 21,352, which falls short of representing the actual population of the county at this time by several thousand.

Financial conditions.—The cash on hand June 30, 1902, was $84,109.25, which, together with the value of the property owned by the county, makes the total credit of the county $592,064.25. The total outstanding indebtedness of the county on June 30 was $445,257.01.

Stock raising.—Throughout the different agricultural sections of the county stock raising is carried on extensively. Large numbers of range cattle are brought to the valleys for fattening, and the shipments of beef cattle to outside markets continue throughout the year. Horses, hogs, and sheep are also raised in the county.

Canals.—Below is given a description in tabular form of the principal canals in operation on the north and south sides of the Salt River in the Salt River Valley:

Name.	Year first used.	Length.	Average width.	Capacity.	Cost.
NORTH SIDE.		*Miles.*	*Feet.*	*Second-feet.*	
Arizona Canal	1886	47	40	1,000	$1,000,000
Grand Canal	1878	26	20	215	25,000
Maricopa Canal	1868	20	18	150	20,000
Salt River Valley Canal	1868	20	15	150	20,000
Farmers' Canal	1871	14	19	.....	75,000
St. Johns Canal	.....	12	.....	.....	.....
SOUTH SIDE.					
Highland Canal	1890	24	16	100	120,000
Consolidated Canal	1891	33	40	1,000	(a)
Mesa Canal	1877	10	15	175	150,000
Utah Canal	1877	11	17	175	40,000
Tempe Canal	1870	30	40	337	150,000
San Francisco Canal	1871	12	10	52	15,000
Broadway Canal	1886	10	8	7	(a)
Marmonie Canal	1887	6	15	.....	6,000

a Not given.

The next largest irrigated portion of the county is the Gila Valley, in which Buckeye and Gila Bend are the principal towns. The canals are as follows:

Principal canals of Gila River, Maricopa County.

	Year first used.	Length.	Average width.	Capacity.	Estimated cost.
		Miles.	*Feet.*	*Second feet.*	
Buckeye Canal	1886	28	16	300	$80,000
Enterprise Canal	1886	12	14	100	10,000
East Riverside Canal	1893	20	17	675	125,000
Lower Gila Bend Canal	1885	20	15	250	25,000
Aztec Canal	1885	14	12	250	6,000
Palomas Canal	1887	22	15	60	10,000

WATER SUPPLY FOR IRRIGATION IN THE SALT RIVER VALLEY.

Mr. Frank P. Trott, water commissioner for the Salt River Valley, submits a statement of the conditions relative to the water supply of the Salt River and the water resources for successfully carrying out a greater system for irrigation throughout the Salt River Valley. Mr. Trott believes that the benefits to be derived from a reservoir and a system which would regulate the water now diverted and used, so as to satisfy actual crop requirements, would equal the benefits to be gained from the flood or surplus water.

The subject of water supply is presented by Mr. Trott as follows:

PHOENIX, ARIZ., *August 26, 1902.*

In my judgment a reservoir constructed with the understanding and actually used for the purpose of controlling and regulating all the water is the only one that can ever give to this valley that service it requires and demands, and in support of this assertion I will try to give a few conservative reasons.

This valley contains an area of 260,000 acres of good productive land, with almost every acre leveled, bordered, and ready to receive the application of water in the highest sense of irrigation. It is surrounded and arteried by canals judiciously located and in fair condition. Each canal is well supplied with laterals running to every section. Most of this land is owned and occupied by the people, who are undoubtedly financially able to construct a reservoir, provided a practicable site is available and the supply of water sufficient to justify its impounding and regulation.

The report of the United States Geological Survey of the Tonto reservoir site on Salt River proves conclusively that such a site lies conveniently near the head of our system, and that the cost of its construction comes easily within our means when we consider the advantages that would accrue in properly serving the water now used in connection with the flood water which could be stored and handled with it. In this connection I respectfully call your attention to the substatement which is presented at the close of my report. This statement handles only the mean monthly discharge for the first seven months of each year for the years 1895 to 1902, inclusive. It shows that the average supply for the seven months of the year 1900 was far below that of any previous year, and that the supply of 1902 was below that of 1900. It also shows that the discharge for the years 1895, 1896, 1897, and 1898, taken as a grand average, gives a daily discharge of 75,057 miner's inches, and that the discharge for the years 1899, 1900, 1901, and 1902, taken in the same way, gives a daily discharge of only 24,567 miner's inches, or a shortage of nearly 70 per cent. This difference is accounted for by the drought which has been prevailing in the arid States and Territories for the last four years, and that our watershed, lying as it does within this scope, failed to receive the usual precipitation. Referring again to the year 1900, there were about 115,000 acres of land in cultivation that year. The average yield was more than two-thirds of a crop, and any farmer who had a partial failure knows that with one or two more irrigations, or a longer run with a little more water, his failure would not have occurred. The reports of the Weather Bureau show the rainfall in this valley for the first seven months of that year to have been far below the normal.

Take the first seven months of this year and in considering them note the reduced supply for the last three months of 1901 (the months when water is needed to properly prepare the soil for seeding and sprouting grain), and yet with only an average supply of 13,246 miner's inches during the crop season there has been raised one-half of the average crop on 110,000 acres cultivated; but owing to the location and character of the soil some farmers had a total failure, while others raised the usual crop. The average rainfall in this valley during these months was less than 1 inch.

There are in round numbers 200 miles of main canals and 900 miles of laterals now in operation. This small average of 13,246 miner's inches ran continuously, or was rotated through 90 per cent of the main canals and 80 per cent of the laterals. The average slope of the banks of the canals and sides of the laterals is about three-fourths to 1, so if there had been running in these canals and laterals a quantity of water averaging 40,000 inches instead of 13,246, the area of surface exposed to evaporation would not have been increased 10 per cent and the loss by absorption more than 5 per cent. The merit of this statement will appear later on, when the discharge from a reservoir is being considered.

To successfully irrigate a body of land an irrigation head is necessary the size of which depends largely on the slope and porousness of the soil and the nature of the crop to be irrigated. With 13,246 inches scattered over an area of 110,000 acres very few farmers could get the proper head, and therefore could not get anything like the results which would have been obtained with the required supply.

I am treating this year's supply in this manner because the effect is fresh in our minds, and for the further purpose of proving that with an average supply of 20,000 miner's inches properly apportioned and judiciously used the area of 110,000 acres which was planted would have produced the normal yield, as the loss in the transmission of this additional amount would have been practically nothing.

The 260,000 acres of farming land lying under our canal system requires no other main canals. There are now too many laterals in use. Some of these should be abandoned and some improvements made in the manner of delivery. These conditions are gradually being bettered, and by the time a reservoir could be completed such matters would no doubt be properly arranged.

Returning once more to the main statement, I desire to say in reference to its correctness that for about three years, at irregular intervals, the United States Geological Survey were having measurements of the Verde and Salt rivers made at stations on each river near their junction, and that for one or two years the Hudson Reservoir Company also had measurements made of these rivers at the same stations but at a different time. My record of the flow is from 10 to 20 per cent less than theirs. This is accounted for in part by the fact that my records show what was actually diverted and used and the surplus water which passed the dam at the Joint Head Canal, a point on the river some 25 miles below the mouth of the Verde River, where their measurements were made.

In compiling this record of discharge I carefully compared their records with my own, and while I consider it impossible to accurately measure and tabulate the discharge of Salt River when in flood, I am fully convinced that the statement comes within less than 20 per cent of the actual flow of the flood water and gives a minus rather than a plus quantity. Previous to 1895 no continuous measurements of the river were made, and any statement purporting to show it is more or less a conjecture. From 1890 to 1895 I was employed by the canal companies to make the official measurements for Mr. W. N. Standage, who was then the court water commissioner, and when not engaged in this duty I was doing engineering work for most of the canals of the valley. Much of this time was devoted to water measurements, and the data in my possession, though disconnected, is ample to prove that the years 1895, 1896, 1897, and 1898, when averaged together, give a fair average for the former conditions, and that the years 1899, 1900, 1901, and 1902 give an average of fully 50 per cent below the normal supply.

Should the Tonto reservoir be built, the water of the Verde River will be an important factor to consider. This river, according to the records, furnishes about 45 per cent of the supply, and there will be times when it is in flood that the canals can not take in and deliver it all. This surplus must, of course, go to waste, but the water of Salt River during these freshets can be stored and held in reserve.

There should be a station established on the Verde at some point distant from the valley, so far as the flow of the water is concerned, equal in effect to the distance to the reservoir on the Salt. From this station the different changes in the discharge of the Verde can be telephoned to the reservoir, and such regulations as may be necessary can be made. In periods of flood in the Verde no water should leave the reservoir, save such as is actually required for minimum power purposes. In this way the loss of water to the valley would be reduced to a very small percentage.

The mean annual discharge of Salt River for the years 1895, 1896, 1897, and 1898 was 60,252 miner's inches, but if we had a continuous record for the past twelve years instead of the past eight or four mentioned, I think these figures would come below the average. Yet, if 60,000 inches were the average, we could not expect to obtain it all; a certain amount would be lost in the floods of the Verde and as much or more through evaporation from the reservoir. The question of what this evaporation would be no one can correctly answer; nothing short of a practical demonstration can ever determine it with exactness. There will be times when the reservoir will be filled and others when it may be empty. Perhaps an average would be somewhere near a half-filled condition. With this as a constant condition and a knowledge of the area of exposure, one might estimate the percentage very closely.

There being an average of 60,000 miner's inches, and 45 per cent of this Verde water, the discharge of the Salt would be 33,000; but the storing and regulation of this average in connection with the Verde's flow would materially affect these figures, so in arriving at this percentage of loss there will be a great diversity of opinion, yet I do not think the wildest would go beyond an average of 5,000 or 6,000 miner's inches.

The carrying capacity of our canals at present is about 90,000 miner's inches (the records show a diversion and use of 87,000). The floods of the Verde River do not often go above this capacity, and when they do it is for a short time only, so a loss to the system from this source will not, in my judgment, exceed 5,000 miner's inches. Now, with 60,000 miner's inches in gross, and a loss of 6,000 by evaporation and 5,000 through our inability to handle all of the flood waters, we will have a net supply of 49,000 miner's inches available.

If an average of 14,000 inches can, as it did in 1900, satisfy the demands of evaporation and percolation in over 900 miles of canals and laterals, and produce two-thirds of a crop on 115,000 acres of land lying in all parts of the valley, the area of land which can be irrigated successfully with a constant supply of 49,000 inches, under perfect control through the same channels with the slight increase in loss as before explained, assisted by a normal precipitation, can not now be estimated. But should it be an error in assuming 60,000 inches as the mean annual average, there certainly can be none in taking the annual for the seven years of 1895 to 1901, inclusive. The statement shows this average to be 45,539 inches, and if we estimate the loss through evaporation and floods at 10,000 inches, we will still have a constant supply of 35,539 inches subject to absolute control for irrigation purposes. Under such conditions there can be no reasonable comparison made with the water which comes to us in the eccentric manner it now does (the full extent of which is only known by those whose duty it is to handle it), but judging from my many years' study of the conditions here and knowledge of the effect of water on our lands, I am firmly of the opinion that, with this quantity stored and properly handled, more than 80 per cent of the lands lying under the present system can be irrigated to their full requirement; and further, feeling that the general average will be nearer 50,000 miner's inches, and being always subject to crop demands, I believe that after the establishment of a thorough system and a well-regulated service there can be no question about our canals being extended and water applied to additional lands without depriving the older lands of one essential inch.

There may come a year like this when a shortage will occur, though with nothing like the present effect. Then, of course, the old lands should be favored according to their priority of rights and requirements. And I believe with this recognition and service that there will never come a time of total failure to any lands, for the old will willingly share with the new to prevent any such disaster. I have during the past four years had the pleasure of seeing owners of old land and rights voluntarily deprive themselves of water to help their neighbors on newer lands. This disposition, as you know, has always been displayed here, and under improved conditions can and will be continued.

It is not necessary for me to say anything about the filling up of the reservoir with silt and sediment. Being an engineer yourself, and having a thorough knowledge of the watershed and able to grasp the immensity of a capacity ranging between 800,000 and 1,500,000 acre-feet, you can estimate the force and time necessary to tear loose and sweep down the enormous mass of matter sufficient to accomplish this result. I believe you will hold with me that the wear and wash of a century would not fill it, though no provision whatever were made for its relief. However, ample measures will be adopted to safeguard it against this danger and every precaution taken for its perpetual efficiency.

In conclusion, it seems to me that the effort to determine and separate the surplus water from the appropriated water, and apply it to certain lands through certain canals, if successful, would create a dual system, an increased expense, and a reduced supply. It would probably delay the construction and might add to the present complications, and should, I think, be considered as a last resort.

The deductions and conclusions embraced in this letter are based entirely on the ground of one grand irrigation system, and I sincerely hope that one may be created and so regulated and restricted that the rights of all will be served with equal justness. The settling of our much magnified differences will accomplish this result, and judging from the serious, earnest, and conservative manner in which our people are now working, there is every reason to believe an agreement will be reached by which these differences will be honestly and fairly adjusted.

Statement of the average monthly discharge of Salt River (in miner's inches) for the years 1895–1902.

[A miner's inch is here interpreted as being one-fortieth part of 1 cubic foot of water flowing per second.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual average.
1895	385,339	111,714	173,239	84,902	31,590	15,985	11,793	37,785	20,567	77,355	67,422	53,116	89,234
1896	33,907	30,904	59,790	51,800	25,041	12,446	59,458	68,831	45,898	35,725	38,892	27,633	40,861
1897	203,149	77,110	153,769	237,364	59,206	20,407	11,542	29,015	93,466	31,254	22,139	22,643	80,089
1898	28,599	50,783	50,578	46,319	25,592	13,062	36,197	39,824	28,414	12,019	15,681	22,810	30,823
1899	27,091	27,569	26,475	29,896	15,949	11,698	24,717	45,344	22,138	29,409	17,307	16,877	24,589
1900	17,482	17,166	15,901	17,016	18,714	6,442	4,438	11,823	9,589	14,120	33,940	17,422	15,338
1901	34,458	136,248	64,965	40,633	29,602	13,067	17,276	43,410	11,102	9,765	15,672	15,004	35,934
1902	15,526	15,697	16,615	18,423	11,169	6,754	6,901	.....	.....	.....	.....	.....	.....
Mean	93,194	58,399	70,166	65,794	27,108	12,483	21,540	39,433	33,025	29,950	30,151	25,072	45,259

Annual monthly average for first seven months.

Month.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	8 years' average.
January	385,339	33,907	203,149	28,599	27,091	17,482	34,458	15,526	93,194
February	111,714	30,904	77,110	50,783	27,569	17,166	136,248	15,697	58,399
March	173,239	59,790	153,769	50,578	26,475	15,901	64,965	16,615	70,166
April	84,902	51,800	237,364	46,319	29,896	17,016	40,633	18,423	65,794
May	31,590	25,041	59,206	25,592	15,949	18,714	29,602	11,169	27,108
June	15,985	12,446	20,407	13,062	11,698	6,442	13,067	6,754	12,483
July	11,793	59,458	11,542	36,197	24,717	4,438	17,276	6,901	21,540
7 months' average.	116,366	39,049	108,935	35,876	23,342	13,880	48,035	13,012	49,812

Seven months' average.

Year.	Inches.	Year.	Inches.
1895	116,366	1899	23,342
1896	39,049	1900	13,880
1897	108,935	1901	48,035
1898	35,876	1902	13,012
4 years' average	75,056½	4 years' average	24,567

NAVAJO COUNTY.

Population.—There has been an increase in the population of Navajo County since the census of 1900, which gave it 8,817. Winslow, an important railway center, and the division point of the Atchison, Topeka and Santa Fe Railway, has experienced considerable progress, and many people have settled there. Other sections of the county also report steady growth. Holbrook, the county seat, and Snowflake are prosperous and growing towns.

Taxable property.—The assessment roll for 1902 shows that the taxable property in Navajo County amounts to $1,092,905.14, a decrease from last year of about $100,000. The decrease is accounted for by Mr. Alex. F. McAllister, clerk of the board of supervisors, in the restrictions placed upon the sheep industry by the creation of forest reserves within the county, resulting in driving out the cattle; and it is further accounted for in the reduction of 25 per cent made on lots and improvements in the town of Winslow; also a reduced rate of

taxation paid by the Santa Fe Pacific Railway, which has 57 miles of track in Navajo County.

Financial condition.—Navajo County was burdened when created by an inheritance of $73,000, representing its share of indebtedness when the area which comprises the county was segregated from Apache County. Navajo County was formed in 1895 by taking considerable of the western portion of Apache County. On January 1, 1903, Navajo County will have paid $44,000 of this indebtedness, the balance of $29,000, under a recent act of Congress, to be refunded under a lower rate of interest and an extended redemptionary time. A bonded indebtedness of $15,000 exists on the buildings of the courthouse and county jail, making a total indebtedness of $44,000. The assets represented in public buildings, bridges, and other county property amounts to $68,730, leaving a balance in favor of the county of $24,730.

Future prosperity.—With the refunding of the Apache County bonds and the operation of the act of Congress creating the Santa Fe Pacific Railroad Company under a new charter, which stipulates that this company shall pay $175 per mile on its right of way through New Mexico and Arizona, the sources of revenue of Navajo County will become greatly increased, and with rigid and honest management of the county government its future prosperity is assured.

Irrigation and farming.—In Navajo County this year there are 4,500 acres of land under cultivation; there are 20 irrigation canals in the county with 35 or 40 miles of laterals, possessing a combined capacity of nearly 4,000 miner's inches of water. All of this has been accomplished by the farmers of the county with the expenditure of their own capital in the most cases. The Mormon settlers of the town of Woodruff succeeded, after a half dozen failures, in placing a substantial dam across the Little Colorado; under the most adverse conditions the Mormons have accomplished wonderful results, and have succeeded in almost every undertaking of this kind. There is a natural reservoir near this settlement which might be utilized to great advantage and profit, and the attention of the Government will no doubt be called to investigate it when the storage of water is taken up in Arizona by the General Government.

Railway interests.—The Santa Fe Pacific Railway has built large roundhouses, machine and repair shops, depot buildings, a hospital for sick and injured employees, and other extensive improvements at Winslow, and the town is mainly supported by the railway interests. The monthly disbursements by the company at Winslow amount to about $40,000.

Developed and undeveloped resources.—The farming interests surrounding Winslow are being developed to a great extent. The rich bottom lands close to Winslow are supplied with water for irrigation from Clear Creek and the Chevelon River. Water is thus carried a distance of 5 and 11 miles, respectively, for use upon these lands, and the successful cultivation of the soil is carried on, the principal product being alfalfa.

Indications of the existence of oil are found near Winslow, and in the northern portion of the county large coal deposits exist which have not been developed. Gypsum and mica are found in the southwestern portion of the county. The manufacture of brick is one of the coming

industries of Navajo County, and will no doubt receive attention in the future.

Shipments at Winslow.—As evidence of the importance of Winslow as a shipping point, the following figures, furnished by courtesy of Mr. C. O. Brown, of the Santa Fe Pacific Railway, are presented to show the shipments from Winslow during the past year: 74 cars of horses, representing an estimated value of $25,000; 112 cars of cattle, estimated value, $45,000; 90 cars of sheep, estimated value, $75,000; 1,350,000 pounds of wool, and 1,200,000 pounds of Government freight.

PINAL COUNTY.

Population.—During the past year Pinal County has made but little advancement in population, although a number of mining camps have been developed where several hundred men are employed, which has added to the population to some extent, so far as the miners and other employees were brought in from mining districts outside the county. The census of 1900 gives the county a population of 6,884.

Taxable property.—The report of Thomas G. Peyton, clerk of the board of supervisors of this county, gives the taxable property as $1,680,802.17.

Financial condition.—Bonded indebtedness, $6,000; funded indebtedness by the Territory, $136,138.08; floating indebtedness, $4,670.40; cash in treasury, $12,035.19.

Development of water.—The Casa Grande Valley Canal furnishes water for the irrigation of about 25,000 acres of land, and there are a great many substantial ranches in this valley. In the San Pedro Valley irrigation is practiced on a smaller scale by ranchers, five or six ditches being in operation. The Arivaipa Creek, a tributary of the San Pedro River, traverses a rich little agricultural valley, and along the creek are found numerous prosperous ranches. Several ditches have been constructed to take water from the Arivaipa Creek onto the lands of ranchers. Several ditches are taken from the Gila River, the largest of which is the Florence, which is 47 miles long, and has an average width of 20 feet. This ditch carries 3,000 miner's inches of water, and was built at a cost of $500,000. In the vicinity of Sacaton, on the reservation, there are ten ditches of small dimensions taking water from the Gila River which are owned and controlled by the Indians.

Stock raising.—The total number of cattle assessed this year in Pinal County is 15,984, valued at $181,020; horses, 2,220, valued at $27,480; mules, 78, valued at $1,830; sheep, 3,500, valued at $7,000; goats, 1,000, valued at $2,000. There is a small decrease in the number of cattle over the preceding year, owing to the drought.

Mining.—Seldom has there been such great activity in mining as was shown during the past year in Pinal County. The great undeveloped resources of this county seem just to have attracted attention, and eastern capital is rushing to Pinal County, where wonderful mineral deposits are found. The mining industry was never brighter than at present. Troy camp, in the Mescal Mountains, is one of the new mining centers of the county. These mines have been developed at enormous expenditure of money, a 60-ton smelter has been supplied

to treat the copper ores, and the camp seems to have entered upon a substantial growth. At present about 100 men are employed, the wage scale being $3.50 and $4 per day. The Newbury camp has 25 men engaged, and the Reward Consolidated has 35 employed. At Mammoth, the great gold camp of the county, activity is suspended owing to litigation. When the Mammoth mines are working employment is furnished for about 800 men, and the ranchers of the San Pedro, Arivaipa, and Gila basins find an excellent home market for their produce.

Undeveloped resources.—Pinal County is rich in undeveloped resources. The construction of the San Carlos dam will be the means of bringing thousands of acres of fertile lands under cultivation, and the county's taxable wealth will be wonderfully increased. The Phœnix & Eastern railway, a proposed route traversing the Gila and San Pedro valleys, will open up a rich country to settlement, and the coming year is very bright for the county.

The Buttes reservoir.—As is generally the case throughout the entire arid region, there is a shortage of water during a few days in the summer season, and to gain absolute security it has been found necessary to supplement the flow of water in the rivers by building storage reservoirs. This has been done in this county by the Casa Grande reservoir, which covers a surface of 1,600 acres, with an average depth of 12 feet, and contains about 8,000,000,000 gallons of water.

In order to make the water system more effective, however, it will be necessary to build another reservoir in the Buttes, 12 miles from Florence. The report of Mr. Arthur P. Davis, of the United States Geological Survey, on the Buttes reservoir, which was published as Senate Doc. No. 27, Fifty-fourth Congress, second session, was most exhaustive. He expressed himself as well pleased with the location, and recommends that the Government build the dam and works in order to supply water in unlimited quantities for the Indians on the Sacaton Reservation. This was the object for which he was sent out, but incidentally the work will be of great benefit to our county. Mr. Davis's report concludes as follows:

> The plan recommended, therefore, is the construction of a storage reservoir at the Buttes, and canal and distributaries on the plan indicated previously in this report. For this plan an appropriation of $2,244,000 should be made immediately available, and authority granted for the condemnation of right of way when necessary.

That Mr. Davis's recommendation will be adopted by Congress in the near future is almost assured, as he shows plainly that the Government could readily recoup itself for the expense of construction by adding value to large tracts of land now worthless, and by rendering the Indians self-supporting. Mr. Davis's work includes a survey of Queen Creek reservoir site, of which he says:

> The Queen project offers as its utmost possibility a supply of water barely sufficient for the present minimum demands of the Indian reservation. If it is intended to settle any considerable number of Indians on the reservation other than those mentioned in this report (and there is an abundant field for that purpose), or if the present Indians grow as they should in numbers and ability to cultivate larger tracts of land, then an additional independent water supply would have to be provided by the relatively more expensive way of pumping. The cost of such additional supply would be somewhat less than the estimates for pumping would indicate, because, in years of excessive supply, the waters of Queen Creek would be made to do the duty and the running expenses of pumping saved. The table shows six such years in the record of twenty-four.

On the other hand, the cost of storage per acre-foot is much less by the use of the Buttes reservoir than by the Queen Creek. It would furnish as much water as might be desired for the Indian reservation and leave a large surplus to be sold to settlers on Government lands, under the canal system. It seems certain that it will some day be desirable to furnish the Indian reservation about 20,000 acre-feet of water per annum. This is double the estimated capacity of the Queen reservoir. If this amount of excess were furnished by pumping from wells this investigation indicates that the entire cost, capitalizing the running expenses at 4 per cent, would be in the neighborhood of $1,000,000. Double this sum invested in the Buttes reservoir would furnish a reliable supply of seven or eight times as much water, and the supply could be used to give value to the large tract of Government land which it would serve, and the Government could thus recoup itself for the expense of construction. Therefore, there is no question but that for the provision of this quantity of water the construction of the Buttes reservoir is by far the cheapest method in the end. Some broad questions of public policy are also involved in this question and deserve serious consideration. These two reservoirs are natural resources, and it is to the public interest that they, together with the public lands which they would water, should be utilized to the greatest possible extent. A broad economy, therefore, dictates the choice of the Buttes project, and the Government being the owner of the lands to be watered, is directly interested in having them reclaimed as economically as possible.

PIMA COUNTY.

Population.—The census of 1900 gives Pima County a population of 14,689. The increase has been rapid and substantial since the census was recorded in 1900, and at the close of the last fiscal year it was conservatively estimated that the county contained 20,000 people. The greatest increase has been in the vicinity of Tucson, the seat of the county's government, where numbers of wealthy, intelligent, and refined people of Northern and Eastern States have located; they have in many instances built beautiful homes, engaging in mining, cattle, or commercial business, thus adding to the wealth of the county. The mining camps have received a liberal share of the new settlers, particularly the western and southern portions of the county. Tucson had a population of 7,531, according to the census of 1900; but the rapid growth of the city during the past two years has greatly added to this number, and a conservative estimate places the city's present population at 10,000.

Financial condition of the county.—The assessed valuation of Pima County's taxable property for the year 1902 amounts to $3,720,317.37, presenting an increase over the year 1901 of $133,523.91, the increase in valuation being due to the extensive improvement of town lots in the city of Tucson. The acreage of cultivated lands in the county is not large, and in the assessment roll it is never separated from the uncultivated lands; the combined acreage amounting to 60,380.5 acres, which, with improvements thereon, are valued at $265,759. There are 17,208.3 acres in land grants within the county; this land, with improvements, is assessed at $10,602. There are 202 patented mines in the county, having an assessed valuation of $63,160.

The bonded indebtedness of Pima County is as follows:

Territorial 5 per cent bonds	$210.240.05
County 7 per cent bonds	100,000.00
County 4 per cent refunding bonds	47,000.00
Total	357,240.05
County floating indebtedness	20,598.05

The resources of Pima County are as follows:

Due from Santa Cruz County, account of the segregation of Pima and Santa Cruz counties, the following bonds, to wit:

7 per cent bonds	$38,513.33	
5 per cent bonds	44,893.67	
		$83,407.00
Cash in treasury		41,783.54
Court-house and county property		50,000.00
		175,190.54

Settlement of lands.—During the past year there were 22 final certificates of Government land issued by the United States Land Office at Tucson for land within Pima County. These covered four sections.

Artesian water.—The development of artesian water in the Santa Cruz Valley near Tucson has been given considerable attention during the year, and the results have been most flattering. At a depth of 15 feet an artesian flow of pure water was developed, the pressure being sufficient to raise the water a foot above the surface of the ground. The first effort in this direction developed a flow of 50,000 gallons per twenty-four hours, and other wells are being sunk in the same vicinity with the hope of securing sufficient water to irrigate large tracts of lands in the valley. At several places in the county water has been developed by sinking a series of wells and putting in pumps of sufficient capacity to raise water for irrigating several hundred acres. The Papago Indians have constructed a dam across the Santa Cruz River, above their reservation south of Tucson, and have succeeded in obtaining enough water to raise crops of hay and grain for their own use.

The stock industry.—There are 2,959 horses in the county, which are valued at $48,270. The number of cattle is estimated at 21,660, with an assessed valuation of $216,600. The milch cows number 381. There are few sheep in the county, no more than two or three bands, aggregating 6,000 all told. The past year being very dry considerable losses of cattle and horses were met with; but with generous rains during the months of August and September of this year cattlemen report a rapid resuscitation of stock and a vast improvement in the ranges throughout the county. The southern portion of the county suffered less from the drought than the western portion.

Mining.—The location of mining claims during the year shows unusual activity in the mining districts of the county. A great many small mines are working constantly, employing from twenty to thirty men. Two of the largest mines in the county closed down early in the spring owing to the low price commanded by copper, but their early resumption is expected. Development of copper, gold, nickel, wolframite, molybdenum, and other metals is being prosecuted with vigor, and the county is regarded as one of the coming mineral divisions in production of mineral wealth.

Water storage.—There are located in Pima County several excellent places provided by nature as natural storage reservoirs. Thousands of acres of rich agricultural lands would at once become productive were any one of these basins developed for the storage of the flood waters. No efforts have been made in the direction of water storage in Pima County, although a number of sites have been located.

Petroleum.—Several thousand acres of land have been located during the year under the mineral laws, and efforts have been made to

develop oil. Two local companies have been trying to locate oil in localities said to be very favorable, but no material results have so far been obtained. One of the companies is operating in the southeastern portion of the county and the other in the northern portion.

County roads.—The roads of the county are in very good condition. A large steel bridge across the Santa Cruz River near Tucson has been completed at a cost of $4,000.

Undeveloped resources.—The undeveloped resources of Pima County are very extensive, the mining districts holding out the greatest possibilities for investors. It is a recognized fact that the mineral resources of Pima County have never been developed, there being at the present time but a very small number of producing mines in the county. Wherever development has been prosecuted to any great depth upon ore bodies, excellent results have invariably been the reward. The county is rich in mineral, and will some day rank with Cochise, Yavapai, and Graham in production. The chief drawback at present in the more remote districts is the lack of railroad facilities for transportation of ores, supplies, and equipment for the mines, which is carried on now at enormous expense to operators. A railroad passing south from Tucson to Nogales would be the means of opening up and developing a rich mineral and agricultural country.

Mr. C. O. Rouse, clerk of the board of supervisors, who has provided me with much of the valuable information contained in this description of Pima County, submits also the following information, which shows the prosperous condition of the county:

The amount of the tax roll for 1901 was $114,116.20, on a $3.70 per hundred county and territorial levy. Of the above amount the delinquent list was $11,339.84, of which amount all but $1,184.76 remains uncollected. Of the amount of the delinquent list remaining uncollected, at least one-half will yet be collected before the time for redemption has expired, and the other half will be the uncollected tax on property sold to the Territory.

SANTA CRUZ COUNTY.

Santa Cruz County contains some rich mining districts, notably Patagonia, Harshaw, Washington Camp, and the Santa Rita mineral districts. There has been during the year considerable development in mining in these districts and extensive improvements have been made in older producing camps.

The county is notable principally for its great cattle ranches and is regarded as one of the most profitable counties for stock raising.

The condition of the county has not been reported, hence I am unable to present a detailed statement of the increased population, stock interests, and other subjects showing the progress made during the year.

Irrigation is carried on near the towns of Nogales, Calabasas, Patagonia, Crittenden, and Lochiel. The supply of water is obtained chiefly from the Sonoita and the Santa Cruz rivers. The latter, rising in the Canille Mountains, flows south into Mexico and then northwesterly through the central portion of the county. The Sonoita has its source in the northeastern part and flowing southwest unites with the Santa Cruz at Calabasas.

The largest irrigation system that has been reported is that of the Calabasas Irrigation, Land, and Water Company. The water for the canal is taken from the Sonoita and Santa Cruz rivers, and is diverted

by three or four temporary dams into the main canal. The canal is 12 miles long. The cost of the system was $10,000, and the number of acres designed to be irrigated by it was 3,000. The supply is not sufficient for the land already under ditch, and this scarcity is especially noticeable in the months of April and May. It is estimated, however, that by the expenditure of $25,000 for the construction of dams to impound the flood waters, 10,000 acres could be brought under cultivation. Other small ditches owned by individuals and taken from the Sonoita River are in operation.

The soil is very fertile, and with plenty of water could easily produce two crops a year, but the supply of surface water is not sufficient for the land already under cultivation. The flow in neither the Sonoita nor the Santa Cruz is continuous. Reservoir sites are reported in which the floods which result after the rainy seasons, from late summer to early fall, could be cheaply stored. The supply of underground water seems to be plentiful.

YAVAPAI COUNTY.

Mr. J. H. Robinson, clerk of the board of supervisors of Yavapai County, submits the following comprehensive report of the progress of Yavapai County during the past year:

Population.—The census of 1900 gave Yavapai County a population of 13,799, but it is safe to say that at the present time the population will exceeed 17,500 souls, as the gains in this county, especially in Prescott and the mining districts, have been enormous. In 1890 the population of Yavapai County was 8,685, and at that time Yavapai County included all of Coconino and a small portion of Gila counties. In 1900 the combined population of Coconino and Yavapai was 19,313. The present combined population shows a gain of 10,628 souls from 1890 to 1900, but the growth in population for the two years just passed in Yavapai County has been considerably greater than at any time in the history of the county.

The new population consists principally of those interested in mining, and is distributed among the various mining districts of the county, although the main growth has been in the city of Prescott, the population of that city having increased wonderfully since the census of 1900. Most of the new population consists of Americans.

Taxable property.—In 1901 the assessed valuation of Yavapai County was $4,346,826.34. In 1902 the same is $5,220,735.91, which shows an increase in taxable property of $873,909.57, the increase being largely among the mining districts, and is augmented by the assessment of patented mines.

Financial condition.—The financial condition of Yavapai County on the 31st day of December, 1901, was as follows:

BONDED INDEBTEDNESS.

Yavapai County redemption bonds, 7 per cent, January 5, 1908	$128,000.00
Territorial funding bonds, 5 per cent, dated July 15, 1892, redeemable after 20 years; mature in 50 years	52,163.00
Territorial funding bonds (under litigation now; declared valid by United States court), 5 per cent, dated July 15, 1896, redeemable after 20 years; mature in 50 years	258,000.00
Total bonded debt	438,163.00

FLOATING DEBT.

Floating debt	$120,320.06
Cash in treasury available for payment of floating debt	90,952.18
Total floating debt	29,367.88

Besides the above $90,952.18, there was in the county treasury at the above date $32,082.80, the same being available for current expenses. Since December 31, 1901, there has been $15,000 of the Yavapai County redemption bonds bearing 7 per cent interest paid and redeemed. The county is not incurring any new indebtedness, and is paying off the bonded indebtedness at the rate of from $15,000 to $20,000 per year, and will increase that amount with the increase of the assessment roll. The tax rate for 1901 of this county was $4 on each $100 valuation.

The property owned by the county is distributed as follows:

County property (real and personal):	
Block of land in Prescott, known as the "Plaza," on which the county courthouse is situated	$75,000
Improvements on said block of ground	40,000
Furniture and fixtures within above buildings	8,000
County hospital (buildings and grounds)	15,000
Branch county jail at Congress	300
Total	138,300
Value of school property in Yavapai County December 31, 1901	62,000
Total value of all county property	200,300

Of the untaxed property, but which will become taxable after certain dates, is the following, to wit:

Railroads (narrow gauge)	miles..	25.8
Railroads (standard gauge)	do...	168.3

These roads were built under acts of the legislature exempting such roads from payment of taxes for certain periods. The roads were built and have aided very materially the growth in this county, and have opened up mineral sections, enabling mines to get their products to smelters and markets at lower rates, and which could not have been worked without the railroads. Of other property in this county which is not yet paying taxes, but will be in the next year, are several unpatented mines, the process of patenting such claims now being under way in the land offices. Of the above railroads, the narrow gauge will become taxable in 1903, thus increasing the assessment roll of this county considerably.

The tax rate of Yavapai County for all purposes per $100 valuation for the year 1902 is as follows:

1. Territorial general fund (par. 3831, R. S., 1901)	$0.35
2. Territorial insane asylum interest fund (par. 3615, R. S., 1901)	.10
3. Territorial normal-school fund (par. 3702, R. S., 1901)	.05
4. Territorial school fund (par. 2246, R. S., 1901)	.03
5. Territorial reform-school fund (par. 3762, R. S., 1901)	.05
6. University fund (par. 3652, R. S., 1901)	.06
7. Northern Arizona normal-school fund (par. 3718, R. S., 1901)	.025
8. Prison fund (par. 3601, R. S., 1901)	.12
9. Ranger fund (par. 3229, R. S., 1901)	.05
10. Redemption fund (par. 3615, R. S., 1901)	.02
11. Capitol building fund (act No. 35, Laws 1901)	.035
12. Interest World's Fair bonds (act 103, Laws 1891)	.002
13. Territorial interest fund (R. S., 2047, and act of Congress 1890)	.14

14. Territorial prison-improvement fund (act 14, Laws 1901)	$0.035
15. Normal school of Arizona dormitory fund (par. 3699, R. S., 1901)	.02
16. Northern Arizona normal-school fund (par. 3719, R. S., 1901)	.01
17. Insane asylum improvement fund (act 62, Laws 1901)	.03
18. University interest fund (par. 3663, R. S., 1901)	.005
19. Interest on St. Louis international bonds (act No. 86, sec. 10, Laws 1901)	.005
Total Territorial purposes	1.137
1. County school fund	0.50
2. County general fund	.95
3. County road fund	.32
4. Interest on $52,163.60 funded indebtedness	.053
5. Interest on other funded indebtedness	.63
6. Interest Yavapai County bonds, 1888	.13
7. Redemption fund, Yavapai County refunding bonds, 1888	.28
Total county purposes	2.863
Total county and Territorial purposes	4.00

Also a special tax of 24 cents on each $100 valuation of all taxable property in school district No. 1, "Prescott" (bonded).

Grand total for Territorial and county purposes is $4 on each $100 valuation.

Grand total for Territorial, county, and school district No. 1, "Prescott" (bonded) is $4.24 on each $100 valuation.

Agriculture.—While the principal industry of Yavapai County is mining, it is not without a large agricultural area, which includes the fertile valleys of the Verde, Skull, Kirkland, Walnut Grove, Williamson, Walnut Creek, Thompson, and Chino, with such bottom lands as stretch along the foothills of the mountains and along the small water courses. All these valleys produce large quantities of alfalfa, all kinds of grain, vegetables, and all fruits, except tropical. The fertility of these valleys can not be surpassed. While there has been no startling growth in the cultivation of lands in this county, there has been a steady one, and with water storage a large area can be reclaimed which is now dormant.

Settlement of lands.—The settlement of lands in this county has decreased very materially in the past few years, which is attributed to the closing up of large areas of land. A great deal of this land, and in fact most of it, is untimbered, and in several instances the closing of such tracts have worked hardships on the settlers or squatters, as some of such land being unsurveyed it was held by squatter's rights, which became void after the setting aside of the reserves. The reserves in this county are to a great extent on nontimbered lands and the closing up of this land not only retards the growth in population, but also in wealth.

Water storage.—With proper water storage in this county thousands of acres of land can be reclaimed and brought under a high state of cultivation, to say nothing of the increased population such reclamation will add to the already increasing population.

The dry beds of creeks and table-lands contain more or less gold which can be worked to a profit with proper water storage, but can not be worked at the present time for the want of such. After water storage is provided, the output of placer gold will exceed that of California in the early days.

Railroad building.—The past year has witnessed the completion of the branch road from Huron Station on the Prescott and Eastern Road to the Poland mines. This road runs the entire distance through mining districts and is destined to open up a large mineral belt.

There is now under way a tunnel from Lynx Creek to the terminal of this road, which, when completed, will be over 8,500 feet in length. This tunnel has several high grade mineral veins. The distance of this branch road is 7.7 miles.

There is now under construction from Mayers to the Bradshaw the Bradshaw Mountain Railroad. There has been completed of this road about six miles, and at the present time several hundred men are employed, and by spring the same will no doubt be completed and will then open up one of the largest and richest mineral sections in the West.

Stock raising.—The entire surface of the county is covered with certain grasses, which afford pasture for all kinds of live stock, and while the past year has witnessed a very dry season, the same has not affected the raising of live stock, as the various shrubs and different kinds of oaks have furnished excellent browsing. The past summer has witnessed several very heavy rains, which caused the grass to spring up and afford pasture for all stock. Cattlemen look for a large increase in live stock during the next year.

Building stone.—Yavapai County has within its borders an unlimited supply of all kinds of building stone, such as onyx, lithograph, tufa, granite, sandstone, pipestone, and several other varieties. It has not only furnished the same to build large buildings in the East and in California, but also furnished the stone for the capitol at Phoenix.

Cities.—Prescott, the county seat, has a population of 5,000 souls. The business portion of the city is of brick, and since the fire of 1900 the city has increased in taxation over $800,000. The residences of the city are among the finest in the Territory. There is now under construction a brick schoolhouse (public) which, when completed, will cost $50,000, and the school system is unsurpassed. The Sisters of St. Joseph have also purchased lots and have plans under way for the building of a schoolhouse and convent which, when completed, will cost about $20,000. Churches are well represented, and all denominations have fine buildings.

The water system is unsurpassed. Water is pumped a distance of 20 miles from Del Rio, the supply coming from springs. The system is owned and operated by the city. The main streets are graded, and the city has a volunteer fire department. Electric lights are in all buildings and arc lights on the corners. There are two telephone systems, the "Independent" and the "Sunset." All fraternal organizations are represented in the city. The Odd Fellows own their own lot and building, and the Masons and Elks also own lots and intend building in the near future. There are two daily papers and one weekly paper published. Prescott is the center of the mining district of Yavapai County.

Jerome has a population of about 2,000 souls, but that does not include the people working for the United Verde Copper Company. The works and town together have a population of over 4,000. The business portion of the town is of brick and the residences are of frame. The district has a fine frame schoolhouse heated by hot air. Jerome has several churches. Water is furnished by the United Verde Copper Company, and the town has a volunteer fire department. The town is lighted by electricity. There are two telephone systems.

Congress is unincorporated; the town is mostly of frame and has a large school building.

Ash Fork, unincorporated, is on the line of the Santa Fe Pacific Railroad, and trains of the Santa Fe, Prescott and Phoenix Railroad make connections at that point.

Mayer is the terminal of the Prescott and Eastern Railroad.

Congress Junction is the shipping point for Congress and Octave.

Bigbug is the center of Bigbug mining district and contains a large mining population.

Mining.—This subject is presented under the title of mining in the preceding pages of this report.

YUMA COUNTY.

Population.—A conservative estimate of the increase in population in Yuma County since the census of 1900 was taken is 500, which gives the county nearly 10,000 people at this time. All European nations and the oriental countries are represented in the population of the county. In the town of Yuma the Mexican population is fully 50 per cent. Along the Colorado Valley, the principal agricultural region, and the most thickly settled portion of the county, the Mexican population is less than 6 per cent, the majority representing every State in the Union. In the mining camps of Yuma County the population is about 30 per cent Mexicans. Engaged in commerce, farming, agriculture, mining, and other honorable pursuits, and foremost in religious and social functions, the Mexican citizen in Yuma to-day compares most favorably with the best type of American citizenship.

Settlement of lands.—Mr. C. P. Cronin has submitted the following report upon this subject, which covers it fully. Mr. Cronin is clerk of the board of supervisors of Yuma County, and has been a close observer of the advancement of the county:

A very substantial increase in the assessment roll of Yuma County for the year 1902 over the previous year is one of the best and surest indications of her material advancement. In 1901 there was assessable 29,885 acres of land at a total valuation of $53,740. The present year shows an acreage of 32,165, with a valuation of $61,574. These figures include but little of the fertile valley just south of the town of Yuma, which was thrown open to settlement in March, 1901, under the provisions of the "Wilson bill." This tract of land comprises about 50,000 acres of the most fertile land in the world, very little of which final proof has been made upon. It has given homes to upward of 400 families since the date of opening, many of the people having come from Texas, California, and other less favored farming sections of the country. This section of Yuma County is conceded to be the richest agricultural district in the Territory of Arizona. Water, the main issue, is very plentiful, especially during the summer months when most needed. A petition is now before Congress praying for the construction of a levee from the town of Yuma to the Mexican line, a distance of 24 miles, insuring the settlers against the occasional spring rise, and reclaiming many hundred acres of rich bottom land.

Canals.—Three canal systems are now supplying an abundance of water in the valley. The Colorado Valley Pumping and Irrigation Company supplies from a gigantic centrifugal pump a narrow strip near the mesa too high for gravity irrigation. The Yuma Valley Union Land and Water Company, or "Farmer's Canal," and the Irrigation Land and Improvement Company, or "Ludy system," each have constructed during the past two years irrigation systems that can not be excelled in the entire West. The Yuma Valley Union Land and Water Company is distinctively a farmers' mutual or cooperative institution, guaranteeing to its members by charter and by-laws that water shall be furnished at actual cost of distribution.

The leading feature and substantial advantage of these canals is in

the fact that the Colorado River carries an abundance of water at all seasons, it being a navigable stream, no dams being required to divert the flow. In a few years, when United States patents are issued for this land, many thousands of dollars will be added to Yuma County's assessment roll.

Up the Colorado River, between the Colorado and Gila rivers, the Rockland Canal, a new enterprise, has reclaimed many thousand acres, expended much capital, and has now in operation 12 miles of main canal, with many miles of laterals. The head gate at Cocopah Point, on the Colorado River, has the advantage of coming through a cleft in the rock bank of the river, a natural head gate. About 1,800 acres are now under irrigation on the east side of the Gila River. It is contemplated at a date in the near future to cross the Gila River at a point about 7 miles east of the town of Yuma. Six 4-foot pipes will be used, iron bound and securely anchored. This irrigation enterprise means more to Yuma County and Arizona in general than any other similar proposition now under contemplation. The very fertile Gila Valley, immediately east of Yuma, will be reclaimed, and after passing through the town of Yuma, every acre of land in the Colorado Valley will be susceptible to gravity irrigation.

Farther up the Colorado River, about 60 miles north of Yuma, the Cibola Valley, while unheralded and little known, is sharing in the general prosperity of this section. The Cibola Canal Company's gravity ditch and the pumping company's pumping plant cover a tract of 12,000 acres, a small portion of which, however, is as yet under cultivation. That this little settlement receives better prices for its products, and is to be considered as the most prosperous farming section of the Territory, is owing to the fact that the adjacent mines of Yuma County and the great mining camp at Picacho, Cal., just across the river, purchase at an advanced price every crop the land will produce.

Moving east along the Gila River, at Mohawk and Palomas, the present year has been one of satisfaction and success. Larger crops of alfalfa and grain than any former year has produced is the almost unexceptional rule, and while at the present time a scarcity of water exists, general advancement and success marks this section.

Activity and progress.—The records of the office of the recorder of Yuma County, an unimpeachable evidence, show greater activity in mining, farming, cattle, and the hog industry than ever before.

The town of Yuma has doubled in size and population in six years. The primitive adobe has given place to the 2 and 3 story brick blocks. The streets are being paved, and modern residences now grace what was only a few short months past barren desert. A modern fire department, fire house, engine, hose cart, and ladder companies, a bank, and two steamship lines on the river are but a few indications of Yuma's rapid strides. That the community is exceptionally prosperous, the inhabitants generally sharing therein, is no way better demonstrated than by the action of the county board of equalization in its July meeting. At that time a uniform raise of 25 per cent was made on all town property, business and residence, over the assessed valuation of 1901.

Another evidence of advancement and growth is the great register of Yuma County. The year 1898 showed 852 citizens of the United States entitled to vote at the general election; 978 votes were cast at

the general election following the registration of 1900, and from a conservative calculation, based upon the number of registration so far received, it is estimated that at least 1,500 names will appear upon the great register for the present year.

Mining.—Yuma County stands among the first counties in mining in Arizona. The development and production of precious metals during the past year has been very great. A review of the progress made will be found under the subject of mining in the preceding pages of this report.

ROSTER OF TERRITORIAL OFFICERS.

(Appointed by the President.)

EXECUTIVE DEPARTMENT.

Governor, Col. Alexander O. Brodie, Yavapai County; secretary of the Territory, Hon. Isaac T. Stoddard, Phoenix.

JUDICIARY DEPARTMENT.

Supreme court: Hon. Edward Kent, chief justice, Phoenix; Hon. George R. Davis, associate justice, Tucson; Hon. Fletcher M. Doan, associate justice, Florence; Hon. Richard E. Sloan, associate justice, Prescott.

District court, first judicial district (comprising counties of Pima, Cochise, and Santa Cruz): Judge, George R. Davis.

District court, second judicial district (comprising counties of Pinal, Gila, and Graham): Judge, Fletcher M. Doan.

District court, third judicial district (comprising counties of Maricopa and Yuma): Judge, Edward Kent.

District court, fourth judicial district (comprising counties of Yavapai, Mohave, Coconino, Apache, and Navajo): Judge, Richard E. Sloan.

United States district attorney: Hon. Frederick L. Nave, Nogales; assistant United States district attorney, John A. Campbell, Tucson.

United States marshal: Col. Myron H. McCord, Phoenix.

United States internal-revenue collector for Arizona and New Mexico: A. L. Morrison, Santa Fe, N. Mex.

United States collector of customs: Frank L. Doan, Nogales.

United States land office, Prescott: Register, Fen. S. Hildreth, Prescott; receiver, J. M. W. Moore, Prescott.

United States land office, Tucson: Register, M. W. Moore, Tucson; receiver, John H. Bauman, Tucson.

United States surveyor-general: Hon. Hugh H. Price, Phoenix.

(Appointed by the governor.)

Territorial treasurer, Isaac M. Christy, Phoenix; Territorial auditor and bank comptroller, W. F. Nichols, Willcox; attorney-general, Edmund W. Wells, Prescott; superintendent of public instruction, Nelson G. Layton, Flagstaff; adjutant-general, Maj. B. W. Leavell, U. S. A., Prescott; board of control, Governor Alexander O. Brodie, chairman; W. F. Nichols, auditor; Ephraim J. Bennitt, citizen member; private secretary to the governor, George H. Smalley, Tucson; assistant secretary of the Territory, William English, Phoenix.

Board of equalization: Hon. W. F. Nichols for the first judicial district, Willcox; Hon. Michael Ohl for the second judicial district, Bonita; Hon. Frank Parker for the third judicial district, Phoenix; Hon. R. N. Fredericks for the fourth judicial district, Prescott.

Officers of Territorial school system: Territorial board of education—Governor Alexander O. Brodie; Hon. Nelson G. Layton, superintendent of public instruction; Hon. Isaac M. Christy, Territorial treasurer, and the president of the university and the principals of the normal schools at Tempe and Flagstaff.

Board of regents, Territorial University: Hon. William Herring, chancellor, Tucson; Col. J. A. Zabriskie, Tucson; Hon. Herbert Tenney, Tucson; Hon. A. V. Grossetta, Tucson; superintendent of public instruction and the governor, ex officio members.